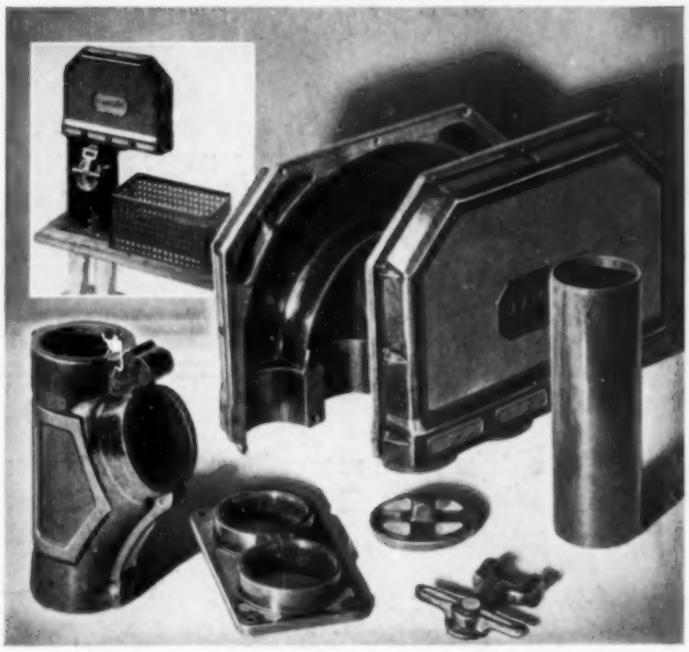
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PLASTICS & MOLDED PRODUCTS

Volume 7 MARCH 1931 Number 3



Bakelite Molded Parts used on the Lamson Pneu-Mode System

Large parts of unusual strength

may be formed of Bakelite Molded

An interesting exhibit of plastic molding to large dimensions is provided by the terminal of the Lamson Pneu-Mode pneumatic tube system. All of the parts, excluding the basket, are formed of Bakelite Molded. The bed-plate is formed in one piece, and the receiving tube in another. Four parts form the sending tube, including hinged cover. Two additional parts form the large delivery chamber.

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PLASTICS & MOLDED PRODUCTS

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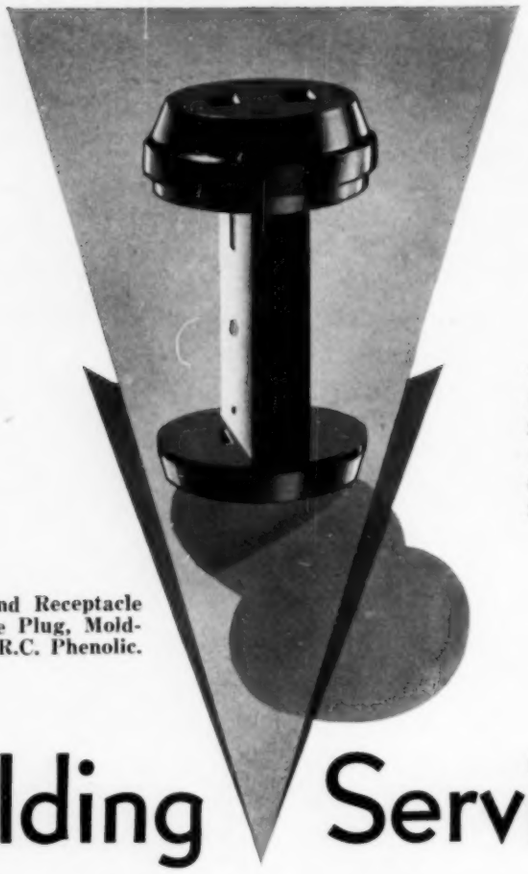
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All editorial and advertising communications should be addressed to the business offices, 114 East 32nd Street, New York, N. Y. Telephones, CAledonia 5-5524,5. Foreign advertising representatives, Willing Ltd. 362 Gray's Road, London, W.C.1 and The A.D.S. Service, Berlin.

Subscription Price, Domestic $2.00. Foreign, $3.00 per year. Single copies 25 cents; back issues, 50c. Publication Office, Washington, N. J.

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PLASTICS & MOLDED PRODUCTS
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Volume 7 MARCH, 1931 Number 3

Mold Costs

By John J. Quigley, C. P. A.

Mr. Quigley has had wide industrial accounting experience and training and, during the past eight years, has been active in this work in the plastics industry. He needs no further introduction to the majority of the molders. This article, which was prepared at our request, is most opportune in dealing with what is one of the most difficult phases of cost accounting. In future articles, now in preparation, Mr. Quigley will somewhat amplify and expand his thoughts with reference to manufacturing overhead.

His views on this much-mooted question are expressed with the hope that through discussion and interchange of ideas, sound practice may be established so that some of the items entering into costs will be clarified, and better control obtained.

The Editor.

MY first experience with the task of distributing manufacturing and overhead expense came when I was bookkeeper, cost clerk, and paymaster, for an iron and steel rolling mill. Our mill was operated at about 60% capacity, and the general overhead applied to the ton of iron produced gave a cost per ton not at all pleasing to our directors. As executives of prosperous New England plants, they were accustomed to the relationship that exists between costs and selling prices and the resulting surplus available as dividends. As we were in the red it was decided that our general accounting practice and cost procedure should be revised and the chief accountant of one of the large textile machinery plants was selected to do the job. He came to the mill, spent one day in the office, and at the end of a week or ten days, I was the recipient of a bulky document bearing the inscription, 'Leave all hope behind ye who enter here." All of the hopelessness was crowded into the General Overhead expense, for he had not recognized the auxiliary services performed by those hands other than the ones at the trains of rolls, and had dumped into General Overhead all Manufacturing Expense other than Direct Labor and Material; and by a careful arithmetical calculation based solely on percentage distribution, he gave us our costs; a high for a low and a low for a high.

The distribution of Manufacturing Expense has always been a most troublesome item in costing, but if the management will picture the services performed by the various expense factors entering into Overhead and will resolve these expenses into services, that is classify them as Power, Maintenance, Rent, Storage, Transportation, etc., and will then distribute these expenses on the basis of services rendered to the products, rather than dump the whole expense into overhead and distribute the mass on a percentage basis, it is evident that a more accurate application of overhead to the product will be obtained.

In the molding industry the Direct Labor costs are:

1. Molding
2. Finishing
3. Inspecting-Work in Process

The indirect or service costs may be:

1. Receiving and Inspecting Raw Materials
2. Pilling or Preforming
3. Maintenance—Presses
4. Maintenance—Molds
5. Maintenance — General Shop
6. Power Plant
7. Tool Room
8. Transportation
9. General Plant Overhead

In this paper I shall consider the effect of Tool Room operations and the cost of Molds and their Maintenance.

New Molds

The cost price of new molds is of course a Capital Expenditure if the mold remains the

property of the molder and is a sales item if the mold becomes the property of the customer. If the mold remains the property of the molder and is likely to stay in production for more than one year, its cost should be charged to a Fixed Asset Account—Own Molds—and this asset value would be subject to Depreciation over the productive life of the mold:—not to exceed three years.

If the mold becomes the property of the customer, any difference between actual cost and selling price should be disposed of through Profit and Loss. If the Sales Department has quoted a price less than the cost of the mold, the loss should be considered a part of getting the business and this is a Sales Expense. If the molder operates a Tool Room and makes his own and customers' Molds, the cost of a mold would be—Material + Direct Labor + Overhead. And the Plant Overhead applied to the Tool Room should be all of the Overhead properly chargeable thereto.

Mold—Maintenance

If the shop were a small one, and all the Mold Maintenance expense incurred outside, the Maintenance cost of each mold would be readily obtainable from the die-maker's charges or invoices. If the work is done in the molder's own Tool Room the direct maintenance cost of each mold is readily determinable from the time cards or tickets and the Tool Room charges for material used.

From experience, and usually not from cost records, we know that the Maintenance cost varies with the type of mold, number of cavities, complexity of inserts, etc. From cost records we should be able to determine the standard Maintenance Cost of various types of molds, and these "standards" should be used in calculating costs of molded pieces; so that a simple molded job would not bear a part of the Maintenance Expense which comes only from a complex job.

Maintenance of Molds should be set up as a service factor. The whole expense of Mold Maintenance should be charged thereto and credits obtained from "standard" maintenance costs, figured on the estimate sheet, should be treated as income of the Mold Maintenance department. If this practice were followed any excessive maintenance costs of molds would be revealed if not recovered through standard costs.

Molds—Amortization

If the cost of a mold is to be amortized over the product, and the selling price of the piece includes this item of cost, the manufacturing expense account should not be burdened with any loss that may occur through differences between actual cost of the mold and the total amount realized from amortized charges. An account should be set up on the books to which should be charged the cost of molds to be amortized, and this account should be credited with amounts realized through additional charges for molds amortized. If the full costs of the molds are not realized the difference should be adjusted through Profit and Loss, and this is a Sales expense or an item chargeable to Management.

Experimental Molds

The cost of Experimental Molds should not be taken up through the Manufacturing expense account. The cost of Experimental Molds is usually not a Capital item and is more properly chargeable to Selling Expense as it is probably a Sales Development matter.

If it were the general practice to budget Sales and Administrative Overhead Expenses, and this practice has much merit, the expense amounts set up for experimental mold costs should be absorbed into monthly costs and the unabsorbed balance carried as a deferred item until the closing of the books.

In concluding this paper, may I say that while I have touched on the question of Mold costs rather briefly, and to some it may seem arbitrarily, my purpose has been to direct the attention of the Molders to the need of better control of the very large item of cost generally referred to as "overhead". To include in Manufacturing Overhead Expense all of the plant expenses other than direct labor and materials, and then distribute this total by percentage of direct labor or direct labor hours is not accurate. The service factors entering into manufacturing expense—Power, Maintenance, etc.—do not each bear the same relation to the different products, and it is only by careful survey and the setting of "standard" costs based on the services rendered that we can arrive at a fair allocation of overhead to the products.

New Bakelite Bound Brook Plant Nearly Ready

CONSTRUCTION work on the Bound Brook plant of the Bakelite Corporation is now rapidly nearing completion. The main building, which is of steel and brick construction, 400 feet square and 90 feet high, is about 95 per cent complete. The five other large buildings, also of brick and steel, which will be used for manufacturing purposes, and nine auxiliary buildings, including boiler plant, machine plant and power house, are also practically finished. Twenty-four tanks for storage of liquid raw materials are now installed, and work of equipping the plant will begin about March first. It is expected that the first unit of the plant will be in actual operation in July, when production will be started on resins, varnish, and molding materials.

Plans for a modern office building have been accepted by the company officials, and are now out for bid.

There will be no additions to the technical staff as present personnel of the Bakelite Corporation plant at Perth Amboy will be transferred as soon as the factory is ready for operation.

Plastic Molding and Materials

By L. M. T. Bell, A. U. C. N.
Borough Polytechnic Institute, London

MAN has raised himself from his primitive condition to his present state of civilization by controlling the forces of nature. To aid him in his work he has utilized those materials which nature has placed at his disposal. When any such materials have been used up or when they have not fully come up to his requirements he has called to his aid the chemist and commanded him to discover new substitutes of a more suitable quality and from materials which are abundant, so that there shall be no shortage of supplies. Thus has a series of synthetic compounds sprung into being, the importance of which it is impossible to overestimate.

The molding industry is well supplied with examples of the chemist's art. Natural resins have been replaced and in some respects surpassed by synthetic products; these have been colored by synthetic dyes in all colors of the rainbow. Flexible glass has been made and then been made non-inflammable. The sap of the rubber tree can be made to do almost anything and can truly be said to carry the industry on its back.

Editor's Note: Mr. Bell's article is a resume of his lecture in the Plastic Materials and Molding Course at the above institution. It was prepared especially for *Plastics & Molded Products* and will appear in no other publication. It will be concluded in the April issue.

The Growth of the Industry

The art of plastic molding is a most ancient one: it is possible that it is second only to wood-working. Clay was the only material worked in the early days. It was molded by hand, frequently on a revolving table; "the potter's wheel" has been referred to by many early writers. Closed molds are quite modern and date back little more than a century or to the time when the modern industry was being born.

The modern molding industry undoubtedly owes its origin to those electrical engineers who foresaw that the method of forming insulating materials into desired shapes by pressure in a closed mold was essentially simple and economically sound. There are no shavings or chips to be wasted, as molding from good molds leaves little or no waste. Intricate contours are machined once and for all in the mold and thereafter reproduced accurately in each molding with a minimum of labor and a maximum of speed. The fundamental superiority of the molding process over all other methods of making large numbers of intricate pieces is undoubtedly the cause of the rapid growth of the industry, and we are probably now at the dawn of a molding age.

Definition of Molding

Molding is the art of forming or modelling under pressure articles from a plastic material, the articles being subsequently hardened (a) chemically by heat before removal from the mold, (2) physically by cooling also before removal from the tool, and (3) semi-chemically by drying or stoving after removal from the tool.

Molding differs from casting only in so far that pressure is required to assist the flow of the highly viscous plastic substances.

Classification of Molding

Theoretically, there are eight ways of molding:—

(1) Mold and compound cold, pressure applied slowly (i. e., squeezed).

TABLE I

Properties of Binders

Material	Melting or Softening Point	Resistance to water and exposure	Resistance to Alcohols	Resistance to Esters and Hydrocarbons	Resistance to Ketones	Effect of Age	Physical nature, Mechanical Strength
Colophony	70	poor	soluble	soluble	soluble	...	Brittle, weak
Shellac	100	poor	soluble	resists	soluble	hardens	Tough, strong
Copal	120-360	good	soluble	resists	doubtful	nil	Strong
Bitumen	120	good	resists	soluble	resists	nil	Strong
Coal Tar Pitch	100	good	resists	soluble	resists	hardens	Brittle
Linseed Oil (x)	...	fairly good	resists	soluble	soluble	hardens	Tough
China Wood Oil (x)	...	good	resists	soluble	soluble	hardens	Tough
Phenol Resin (x)	variable	medium	soluble	resists	soluble	hardens	Strong
Uren Resin (x)	variable	doubtful	soluble	resists	soluble	hardens	Medium
Hard Rubber (x)	flex till cured	doubtful	resists	soluble	resists	deteriorates	Tough
Cellulose Nitrate (o)	inflam.	medium	resists	resists	soluble	hardens	Flex, Strong
Cellulose Acetate (o)	50	medium	resists	resists	soluble	hardens	Flex, Strong
Calcium Silicate	950	poor	resists	resists	resists	nil	Hard
Clay	1200	good	resists	resists	resists	nil	Hard
Lead Borate	600	good	resists	resists	resists	nil	Hard

(x) These binders are hardened chemically during manufacture. Further hardening is possible in service. Resistance to chemicals increases on hardening.
(o) Plasticiser used in manufacture—gradually works out leaving material brittle and harder but chemically unchanged.

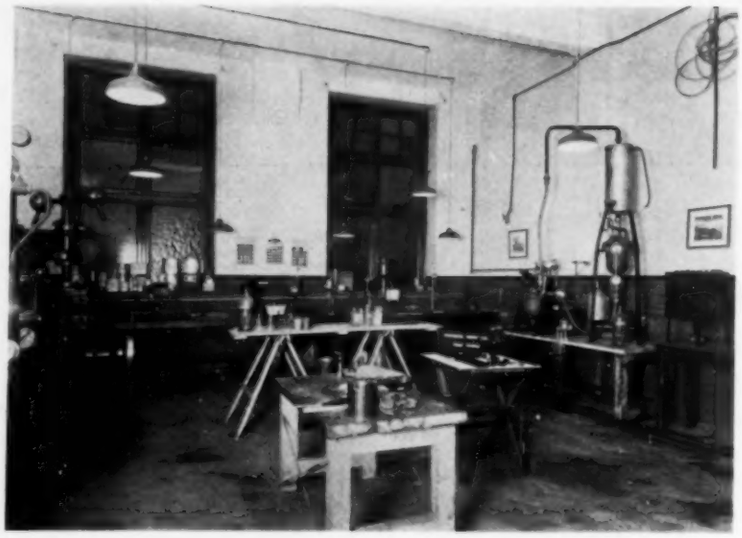
(2) Mold and compound cold, pressure applied quickly (i. e., precussion).
(3) Mold warm, compound hot, pressure applied slowly.
(4) Mold warm, compound hot, pressure applied quickly.
(5) Mold hot, compound cold, pressure applied slowly (thermosetting).
(6) Mold, hot, compound cold, pressure applied quickly (thermosetting).
(7) Mold hot, compound hot or cold, pressure applied slowly (thermoplastic).
(8) Mold hot, compound hot or cold, pressure applied quickly.

In practice only four of the possible methods are used, viz., 2, 4, 5, and 7.

At first sight it may appear unnecessary to differentiate between the two methods of applying pressure, but take the case of fireproof and arc-resisting compounds—these are wet mixes containing a big percentage of asbestos fibre. They do not flow in the true sense of the word and so have to be bumped or knocked into shape by a quick-acting press. With thermoplastic compounds, quick-acting presses may also be desirable, for the compound is first heated until easily moldable, then placed in a mold at some suitable temperature just below the melting point of the compound. The mold must then be completely closed before any appreciable hardening has taken place, and this can only be done with the aid of a quick-acting press.

Slow-acting presses are required for thermosetting compounds, whether the material is introduced to the hot mold either in cold powder or pellet form. A delay action is necessary to enable the material to be heated to beyond its fluxing temperature before exerting the final squeeze, otherwise mold pins will be bent or broken and molds distorted or damaged.

The best molding finishes are produced by this hot molding method as in the case of Bakelite, urea formaldehyde, and shellac compositions. The last-named compounds are thermoplastics. In the case of phonograph records the material is hot when placed in the hot mold. Cooling is immediately commenced and the resulting molding has a finish which leaves little or nothing to be desired. It is only by the absence of surface wrinkles that perfect phonograph records are at all possible and the absence of needle scratch on some examples is really remarkable.



Still and Test Benches in Molding Laboratory of Borough Polytechnic Institute, London.

TABLE II
Properties of Common Fillers

Material	Resistance to Heat	Physical Nature	Resistance to Moisture	Resistance to Oil	Electrical Insulation Properties
Wood Flour	115-135°C	Fibrous, tough	Poor	Absorbs	Good when dry
Paper Pulp	115°C	Fibrous, tough	Poor	Absorbs	Good when dry
Woven Fabric	115°C	Woven, strong	Poor	Absorbs	Good when dry
Asbestos	700°C	Fibrous, tough	Medium	Good	Medium when pure
China Clay	1200°C	Granular	Poor	Good	Fairly good
Slate Dust	1200°C	Amorphous	Medium	Good	Fairly good
Mica	800°C	Flakes	Good	Good	Excellent

Classification of the Finished Moldings.

The finished materials have properties which enable them to be divided into three groups:—the fireproof and arc-resisting, the heat-resisting, and the fusible compounds. The latter are among the best electrical insulating compounds, but they cannot resist the action of heat, softening at temperatures below 100 degrees C. The heat resisting bodies are principally the thermo-setting compounds of the Bakelite and urea formaldehyde class. While the fireproof compounds are inorganic substances — cement bonded — or containing so little organic bond that an almost unbroken surface of asbestos is presented to any arc or stray flame, they are not usually so resistant to moisture as the first two types of moldings.

Structure of Materials

Most molding mixtures consist of a body or filler united by a bond of resinous material. The filler is as fibrous as possible so that by the interlocking of the fibres the natural strength of the resin is reinforced as much as possible. But the more fibrous the filler the less perfect the finish of the molding, so that care must be exercised in the choice of a suitable filler. When a perfect surface is absolutely essential (as in phonograph discs) the mechanical strength of the molding is sacrificed and an amorphous filler used:—slate dust, china clay, etc.

Moldings can now be compared to brick walls, the cement or mortar being the bond and

TABLE III
Some Properties of Typical Compounds

Material	Appearance	Water Absorption 24 hours at 18 C	Maximum Working Temperature	Compress. Strength lbs./sq. in.	Transverse Strength lbs./sq. in.	Resistance to Impact lbs./sq. in.	Breakdown Voltage KV. spec. 0.2"	Brinnell Hardness 18°C	Action of Oil
Pitch asbestos "muckite"	Smooth Black	Nil	50°C	8000	360	1.5	30	..	Absorbs
Bitumen Asbestos	Smooth, black	Nil	80	9000	360	1.5	50	..	Absorbs
Vulcanized Asbestos	Rough, brown	0.4 %	100	8000	360	1.3	50	..	Affects
Synthetic Bonded Asbestos	Rough	0.6 %	150	15000	900	1.8	40	25	Nil
Shellac-Slate Dust	Polished, black	0.15%	60	7000	500	0.8	40	..	Slight
Phenol Formaldehyde-Wood Flour	Polished Various	0.2 %	120	20000	1600	2.8	50	50	Nil
Urea Resin-Paper Pulp	Polished Various	0.25%	110	18000	1100	2.0	50	45	Nil
Phenol Resin—Fabric	Polished	0.60%	110	35000	2500	10.0	40	50	Nil
Hard Rubber	Polished	0.02%	85	13000	1100	2.0	70	50	Slight
Celluloid	Polished	0.3 %	35	Flex	Flex	Flex	60	..	Nil
Cellulose Acetate	Polished	0.4 %	45	Flex	Flex	Flex	60	..	Nil
Calcium Silicate—Asbestos	Rough	10 %	700	10000	400	1.2	low	30	Absorbs
Clay-Porcelain	Rough or Glazed	Nil	1000	7000	360	0.8	40	..	Nil
Lead Borate-Mica	Smooth	Nil	400	26000	2500	1.8	65	20	Nil

the brick the filler, and just as a brick wall would be weak but for the interlocking of the bricks, so a molding will be weak mechanically unless a fibrous filler is used in the manufacture of the material, allowing the interlocking fibres to reinforce the natural strength of the resin. Most resins are weak and brittle and a fibrous filler is necessary to form a commercially strong mix; but hard rubber, celluloid, and cellulose acetate are frequently used without such reinforcement *when inclusion of a filler is thought to be undesirable for* other reasons.

Properties of Moldings

Certain properties of the moldings have been indicated in the previous paragraphs, but the conclusion of this rough survey of the materials would be incomplete without some general reference.

Moldings are porous or non-porous according to their composition. Resin-bonded moldings are usually non-porous. Cement-bonded moldings are usually the mean of the two or various constituents, but the following special remarks should be noted:—Rigidity is principally in the bond, resistance to exposure largely that of the least stable member (again, usually the bond).

On the non-porous materials almost the same remarks apply; chemical resistance is principally that of the resin (usually the least stable member), the possibility of fracture of the resin skin exposing the filler to attack must not be overlooked, heat resistance is always that of the least stable member. Thus Bakelite will not work continuously above 125 degrees C., at which temperature wood flour slowly decomposes. Synthetic bonded asbestos resists 180-200 degrees C., when the resin has a tendency to become brittle.

In the case of stabilite and shellac compounds the filler is added to give surface hardness (friction) and, if possible, cheapness to the moldings.

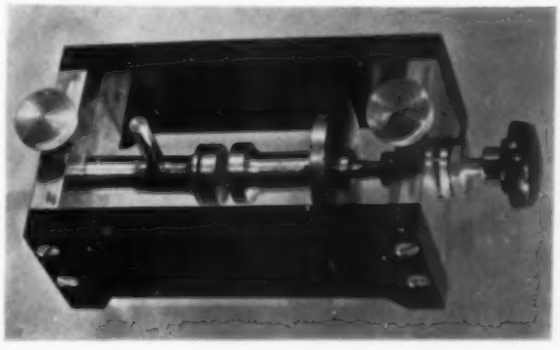
Conclusion

While every attempt has been made to give a general introductory survey of the molding industry, it must be admitted that no such survey can be always reliable or accurate, for take the case of the electrical insulation resistance of materials—say a graphite and phenol resin mix. According to the method of mixing and molding, such articles can be insulators or conductors and can even be insulators in one direction and conductors in the other, the graphite grains touching each other to form chains in one direction, but a film of resin insulating one chain from the next to form an insulator in the cross direction.

Table I. gives some properties of typical binders, Table II., some properties of typical fillers, and Table III., some properties of typical compounds.

Molded Durez in Special Equipment

MOLDED plastics in one form or another find their way into a diversity of uses. This time a manufacturer was assisted in making up a special piece of laboratory equipment. The apparatus was necessary for the rapid determination of dielectric strength on a certain no such survey can be always reinsulating compound. The photograph shows the sides of the box made from molded Durez to withstand the high voltage. The micrometer adjustment of one of the electrodes is surmounted with a Durez knob. The Durez side walls and molded knob offered the necessary resistance to the electric charge; they were also insoluble in the bath of warm transil oil in which the test was made. The sides were easily cut and machined from regular molded sheet stock; they offered the rigidity necessary. "Eminently satisfactory," writes the manufacturer.

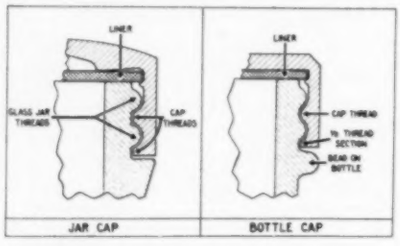


New Designs in Molded Closures

Anchor Jar and Bottle Caps Embody New Features in Construction and Molding Technique Which Assure Wider Usefulness

BOTTLE, jar and collapsible tube closures molded out of plastic materials have been offered to the packaging trade now for fully five years. In the course of this time, a considerable appreciation and demand have been built up for this article purely on the basis of improved appearance and greater consumer acceptance. The outlet, for this type of molded product, was initiated and sponsored by various factors in the plastic material and molding industries, to which no small credit is due.

However, this pioneer work has been amplified by the efforts of the Anchor Cap & Closure Corp., long specialists in the packaging field, who have applied several new design features in their molded cap. This company set up certain exacting requirements in the problem of designing a molded cap which, to their mind, had never been completely and satisfactorily met. Their specifications called for several new departures which, when summed up, would yield the closest possible approach to a perfect seal for glass containers, in the form of either jars or bottles. These details include special thread designs, a new form of truss-dome, wedge top construction for jar caps, and a recess for retaining liners in their proper position in all caps. The company believes that these new features constitute a big step forward in molded closure construction, and that they will make the inherent advantages of molded caps more valuable and more useful, and open up the application of these closures to the packaging of an increasing number of products.



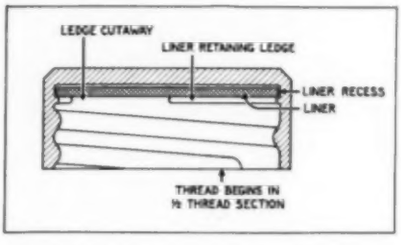
Special Thread Design

The special thread design of the Anchor Molded Caps, either bottle or jar type, was obtained only by developing a new method of manufacture giving decidedly better sealing results. One can readily notice in the diagrams above how the cap threads fill up practically all the space between the glass threads. Built as they are around the contour of the glass thread according to the Glass Container Association specifications, there is obtained not only greater strength in the thread but a surer, snugger fit. While at the start of the thread, it is broad and rounded in shape, as it nears the bottom of the cap it tapers down to approximately one-half its former width. This permits the cap thread to grip the glass thread around the entire circumference, including the lower end of the glass thread which is ordinarily useless. Consequently the thread construction promotes even distribution of sealing pressure, giving added strength to the cap and better sealing qualities.

In the Anchor Molded Cap the threads do not continue through the full depth of the cap. This would be simplest and cheapest from a manufacturing standpoint, but the new design calls for an exact predetermined thread length, so as not to interfere with the proper seating of the liner or the proper tightening of the cap.

Liner Recess and Retaining Ledge

As one can see from the diagram below, there is a small ridge or raised ledge encircling the inside of the cap. This is just far enough below the top of the cap to allow space for the liner to fit easily above it, in the liner recess.



This feature performs a most important function. It does just as the name implies—holds the liner in place in the cap, yet at the same time allows it to rotate freely. As a result, liners will not fall out during shipment or in rough handling in the sealing process. This insures that the product in the container





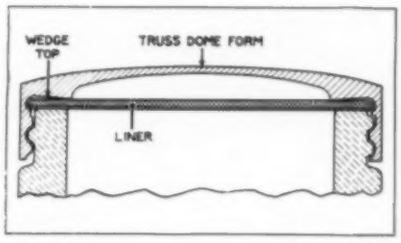
will go out to the trade properly capped and protected. It permits shipment of caps with proper, accurately cut liners inserted — thereby eliminating any need for assembly by the packer.

The fact that the recess allows the liner to rotate freely renders oversize liners unnecessarily, thus preventing wrinkling, buckling or possible damage to the liner surface in sealing.

Another important point is that the liner will stay in the cap and will not adhere to top of glass container on removal of cap. This occurs very frequently when the product is viscous and sticky. Thus the consumer continues to get an efficient seal and is spared the annoyance of replacing the liner or, as more usually happens, throwing it away, thus destroying the resealing quality of the cap and jeopardizing the consumer good will.

Wedge Top Construction of Jar Caps

Quite noteworthy is the fact that the top (inside) of the Anchor Molded Jar Cap is not parallel with the top of the bottle, but slopes toward the center all the way around the inside. This may be easily seen from the drawing below. This is another improvement that makes a great deal of difference in the sealing quality of the cap.



The wedge action that takes place when the cap is screwed home forces the liner to bend slightly, giving a "spring seal" effect. Thus in tightening the cap (either by hand or machine) there is a gradual resistance. This makes it unlikely that the cap will be forced on too tightly. Yet, the cap has a grip that resists any loosening from subsequent rough handling.

The wedge construction also helps in concentrating the sealing pressure. Furthermore, it automatically "centers" the cap on the jar regardless of variations in the glass finish, and thus provides an even sealing pressure around the complete top circumference of the container finish.

The top of the jar cap is designed in the form of a true truss dome according to sound engineering principles. This was done with the idea of distributing the greatest mass of material at a point where the greatest stress occurs, yet giving the piece maximum elasticity, as far as the properties of the molding material permit.

"Plastische Massen" Makes Its Bow in Germany

By Carl Marx, Editor of "Plastics"

WHEN we initiated the first journal in the world *exclusively* devoted to plastics back in 1925, we felt sure we were on the right track. Our journal received a splendid reception—both here and abroad. For a few years we were alone with our valued French contemporary, *Revue generale des Matieres Plastiques* which started in France about the same time we did, but which included many products other than plastics.

Then late in 1929 came a British journal—*British Plastics and Molded Products Trader*—which was designed to serve the interests of the plastics industry in that Empire. That this great industrial nation has become "plastic conscious" is evidenced by the healthy growth of this paper.

And now we welcome to this field a new German monthly—"PLASTISCHE MASSEN—in Wissenschaft und Technik" published by the Verlag Physik G. m. b. H at Troisdorf in Germany, the first issue being January 1, 1931, Vol. 1, No. 1.

The first issue is excellent, and the journal will probably have a long and interesting career. Subscription price is 15 marks.

It is on a scientific plane, although it contains also articles on new uses for molded products. The editor is Dr. Franz Pabst.

Some of the articles are:

The Phenolic Casting Resins by Dr. Koebner, of Ludwigshafen; a very interesting article on the "Flow and Rupture of the Earth's Crust and on a Geological Experiment" by Prof. Dr. H. Cloos, of Bonn—which throws some interesting light on what happens when a product is molded.

Another very interesting article is "History of Plastic Molded Products as a Structural Material in Telephone Practice" by Dipl. Ing. K. Hesse, of Berlin. Other articles deal with filtering systems, insulated molded lamps and abstracts. Thus far patents are noticeable by their absence. Many more articles are promised for future issues. The issue is only 20 pages of text—but excellently printed.

Wir wunschen der Zeitschrift "PLASTISCHE MASSEN" den besten Erfolg.

Technology of Cellulose Acetate

Progress in the Preparation of this Cellulose Ester as Shown in the World's Patent Literature during the Last Decade.

By Dr. Aladin

Our readers are already well acquainted with the writer of this extensive and comprehensive review, for his similar compilation of Synthetic Resins has appeared during 1929 and 1930 in the pages of PLASTICS AND MOLDED PRODUCTS. Earlier resumes of a similar kind have appeared in our German contemporary KUNSTSTOFFE during 1926-1928.

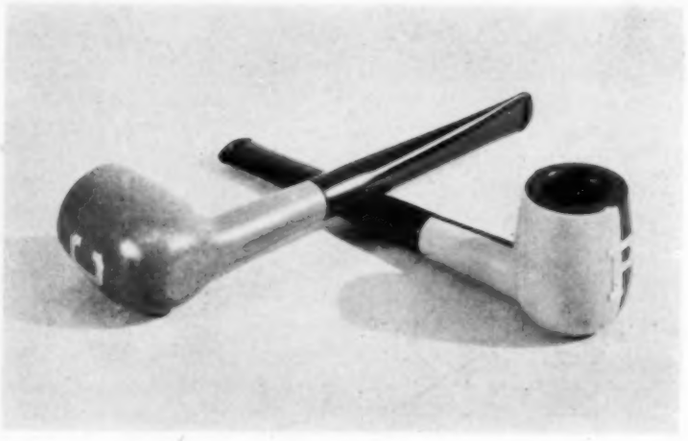
The present review covers the patents of all countries, and is the most complete review on the subject of cellulose acetate since the appearance of E. C. Worden's Technology of Cellulose Esters in 1920. The patents number 235. At the end of the series, a complete patent-number index will be given, similar to the one that appeared in the October 1930 issue of this journal. We feel certain that our many readers will thoroughly appreciate this article.

Dr. Aladin is the nom-de-plume of one of Europe's outstanding organic chemists, who has had a quarter of a century's experience in the field of organic chemistry and particularly with the cellulose esters, plastics and resins. We are pleased to announce that we have the exclusive publishing rights to this review.

Editor's Note

THE preparation of cellulose acetate has made more real progress during the past five years than it has during the next preceding twenty years. The great advances made can be directly traced to the fact that some of the greatest research minds in this field had vigorously attacked the problem. The main difficulty that remained to be solved, was the sometimes entirely unaccountable differences that developed between two batches, and even between two carefully controlled parallel laboratory experimental batches, for causes that at first utterly defied analysis; so that it often happened that two batches made under conditions believed to be exactly identical would turn out so different that while one of them was useable, the other was worthless, and remained so despite all efforts to improve it. It had been found impossible to improve the solubility of a batch of cellulose acetate by any so-called "life-saving" methods.

Cellulose, taking it on the basis of the basis of the six-carbon molecule, $C_6H_{12}O_6$ was soon found to contain only three alcoholic hydroxyl groups capable of acetation. Earlier workers had assumed that the highest stage of acetation was a tetra-acetate, but more recent tests have positively demontrated that this view was incorrect. The cellulose tri-acetate, which is the product of the highest degree of cellulose acetation contains 44.8% of acetic acid in the combined form. This product, by reason of its very limited solubility, proved to be commercially useless until it was discovered that by subsequent saponification (removal of some of the combined acetic acid) it could be so altered as to yield more soluble products, with which the technologists were able to work and to produce therefrom satisfactory and saleable products. This partial saponification was carried out to such an extent that the acetic acid content of the product was brought down to from 36 to 42%. In the course of time, it has been determined, mainly by experiment and often empirically, how to treat the cellulose tri-acetate in order to eventuate products having just the desired properties for the preparation of films, lacquers and other uses. Very many attempts have been made directly to produce an acetate lying intermediate of the di- acetate and the tri-acetate, so as to obtain a suitable product by but a single operation, but thus far all commercial processes depend upon the formation first of the tri-acetate, fol-



Something new—Bakelite pipes in your alma mater colors with initials.

lowed by suitable treatments to remove part of the combined acetic acid so as to yield acetates having the desired solubility and plasticity characteristics.

The question as to whether three acetyl groups in cellulose tri-acetate were equivalent to each other and to the hydroxyl groups that they occupied, has not as yet satisfactorily been solved. Although this point is very interesting from a theoretical point of view, it is of no great practical importance, because the industry has solved this phase of the problem empirically by experimentation and trial.

Acetating Media

Closely associated with the research on the constitution of cellulose acetate has been that which was aimed at developing the most suitable acetating media; but at this writing acetic anhydride still remains practically the sole useful acetating agent. The acetation of cellulose by the aid of ketene as described in U. S. P. 1,604,471 (No. 122 hereinbelow) and in U. S. P. 1,685,220 (No. 124) is of course interesting theoretically, but as yet too expensive, as the ketene can only be prepared from acetone with comparatively slight yields, As acetone is made indirectly from acetic acid, there can hardly be any commercial advantage, at least at the present time, in such a process. Other sources of ketene are not as yet commercially available.

When employing acetic anhydride as the acetating medium, an excess must be employed in order to insure the proper course of the reaction and the substantial completion of the acetation. The acetic anhydride, in turn, is derived from glacial (anhydrous) acetic acid. During the decade covered by the present resume and digest, methods have been developed for more cheaply producing glacial acetic acid and hence of acetic anhydride. While formerly the main source of acetic acid was the wood-distillation industries — fermentation acetic acid not being available in any large quantities — chemists have however learned how to produce acetic acid synthetically from products produced in the inorganic field. For example acetic acid can be prepared from calcium carbide, a furnace product, acetylene being an intermediate product, thus:

$$CaC_2 + H_2O = C_2H_2 + Ca(OH)_2,$$

the acetylene combining with the elements of water in an acid medium in the presence of mercury salts to form acetaldehyde quantitatively, thus:

$$C_2H_2 + H_2O = CH_3CHO,$$

and this acetaldehyde, by addition of oxygen, forms acetic acid:

$$CH_3CHO + O = CH_3COOH$$

If the dilute sulfuric acid used as the acid medium in the above reaction, is replaced by glacial acetic acid, i. e. if acetylene gas is passed into glacial acetic acid in presence of mercury salts, a product termed ethylidene diacetate will form:

$$2\ CH_3COOH + C_2H_2 = CH_3CH(OCOCH_3)_2$$

which product, by a most remarkable reaction when distilled under definite and controlled conditions, splits up into acetaldehyde and acetic anhydride:

$$CH_3CH(OCOCH_3)_2 = CH_3CHO + (CH_3O)_2O$$

the resultant mixture being readily separated into its constituents by distillation. According to this clever method large quantities of acetic anhydride have already been manufactured.

The latest process in this field starts out with glacial acetic acid whose vapors at an elevated temperature can be converted into a mixture of acetic anhydride and water, thus:

$$2\ CH_3COOH = H_2O + (CH_3CO)_2O$$

It has been found possible to condense this mixture and to separate the water and the acetic anhydride with but very little re-combination into acetic acid.

It will thus be seen that chemical industry has done almost everything possible in order to provide the manufacturers of cellulose acetate with cheap acetating reagents. As experiments have taught, it is not possible to produce a cellulose tri-acetate that is chloroform-soluble by the use of acetic anhydride alone, for the acetation will stop short of the desired product, but yield quite worthless materials. The formation of the desired tri-ace-



Paper weights of black Durez with an antique copper metal insert. Molded by Norton Laboratories

tate takes place only in the presence of catalytic agents or catalysts, which mainly are of an acid nature, and which appear to act by forming intermediate products and combinations which as yet have not been isolated and identified. It has, however, been found possible to act on the cellulose with the catalysts in advance of submission of the cellulose to the acetating reagents. The most commonly used catalyst is sulfuric acid, but, as the patents to be reviewed will show, quite a number of catalysts have been proposed and used.

In order that my readers will have some immediate advance information, which will help them in finding what they want, I have subjoined at this point a classified list of patent numbers in which the various catalysts are designated by the patents using them, classifying them according to the particular catalyst employed. Later the patents themselves will be briefed. The serial numbers following the patent numbers are those of the individual patents in the present review.

---

1. Pre-treatment of cellulose with reagents which on subsequent acetation act catalytically:—

		Serial No.
Ammonia		
B. P.	293,757	83
Alkalies, soda solutions, alkaline substances, hypochlorites, hydrogen dioxide, perborates, etc.		
U. S. P.	1,711,110	23
B. P.	375,902	27
U. S. P.	1,668,485	22
F. P.	662,265	30
Hydrogen dioxide + sodium hydroxide		
U. S. P.	1,379,699	21
U. S. P.	1,457,131	87
U. S. P.	1,528,810	89
U. S. P.	1,600,159	121
Chlorine or bromine vapors + acetic acid vapor		
U. S. P.	1,668,483	33
Chlorinating agents		
F. P.	525,738	43
Concentrated inorganic acids		
B. P.	298,087	39
Dilute sulfuric acid		
U. S. P.	1,503,604	32
U. S. P.	1,668,959	34
Ger. P.	482,727	37
Halogen acids		
B. P.	312,098	42
Halogen acids + glacial acetic acid		
B. P.	312,098	42
Highly concentrated hydrochloric acid		
U. S. P.	1,679,966	35
Sulfuric acid + phosphoric acid + acetic acid		
U. S. P.	1,683,347	36
Hydrofluoric acid		
B. P.	308,348	47
Thionylchloride		
U. S. P.	1,701,229	95
Austrian P.	87,646	47
Zinc chloride		
B. P.	298,087	39
Calcium thiocyanate		
B. P.	298,087	39

Organic Substances

		Serial No.
Dilute organic acids		
Ger. P.	456,929	59
Formic acid		
U. S. P.	1,671,513	53
U. S. P.	1,697,707	56
U. S. P.	1,711,111	57
U. S. P.	1,722,914	58
B. P.	263,939	63
B. P.	264,937	65
B. P.	305,601	72
B. P.	308,322	73
B. P.	372,095	74
F. P.	621,376	76
Formic and sulfuric acids		
U. S. P.	1,671,513	53
F. P.	621,376	76
Formic acid and sulfuryl chloride		
B. P.	287,540	68
Formic acid and phosphorus oxychloside		
B. P.	287,540	68
Formic acid and zinc chloride		
U. S. P.	1,671,513	53
B. P.	287,540	68
Acetic acid (glacial)		
U. S. P.	1,543,310	49
U. S. P.	1,668,944	51
U. S. P.	1,668,945	52
U. S. P.	1,687,059	54
U. S. P.	1,692,622	55
U. S. P.	1,711,111	57
B. P.	263,939	63
B. P.	264,937	65
B. P.	293,757	83
B. P.	308,322	73
B. P.	312,095	74
F. P.	639,119	78
Acetic acid vapor		
U. S. P.	1,668,484	50
Acetic acid vapors, phosphoric and sulfuric acids + phosphoric acid		
U. S. P.	1,652,573	123
B. P.	269,530	148
Acetic acid vapors and sulfuric acid		
U. S. P.	1,683,347	36
Acetic acid vapors and halogen acids		
B. P.	312,098	42
Lactic acid		
B. P.	268,289	66
Phenol		
U. S. P.	1,687,103	87
Pyridine		
B. P.	293,757	83
Formaldehyde		
B. P.	290,757	83

II. Actual catalysts added to the acetating reagents.

Inorganic Acids and Derivatives

		Serial No.
Sulfuric acid		
U. S. P.	1,389,250	85
U. S. P.	1,445,382	86
U. S. P.	1,457,131	87
U. S. P.	1,466,329	88
U. S. P.	1,528,810	89
U. S. P.	1,543,310	49
U. S. P.	1,546,679	120
U. S. P.	1,600,159	121
U. S. P.	1,708,787	125
B. P.	145,525	135
B. P.	146,092	136
B. P.	264,937	65
B. P.	287,540	68
B. P.	294,415	149
B. P.	300,140	150
B. P.	303,135	152
B. P.	303,491	154
B. P.	335,674	156
B. P.	306,531	157
F. P.	621,376	76
F. P.	658,324	165
F. P.	663,268	168
F. P.	664,214	169
Swiss P.	83,814	176
Swiss P.	95,042	177
Sulfuric acid plus bromine		
B. P.	303,135	152
Sulfuric acid plus chromic acid		
B. P.	282,793	101
Sulfuric acid plus Manganic acid		
B. P.	282,793	101
Sulfuric acid plus permanganic acid		
B. P.	282,793	101
Sulfuric acid plus phosphoric acid		
U. S. P.	1,690,632	94
Sulfuric acid plus sulfomonoper-acid		
B. P.	282,793	101
Sulfuric acid plus bisulfate		
Swiss P.	94,022	119
Sulfuric acide plus manganese acetate		
B. P.	282,793	101
Sulfuric acid plus manganese sulfate		
B. P.	282,793	101
Sulfuric acid plus peracetic acid		
B. P.	282,793	101
Sulfuric acid plus sulfur trioxide (gaseous)		
B. P.	200,160	140

(Continued on page 171)

EASTMAN CELLULOSE ACETATE

Makes possible products of delicate color or glass-like transparency

AMONG the many outstanding features of cellulose acetate are its freedom from color and its ability to take coloring. Pure white, delicate pastel shades, pale creams, etc., can be uniformly reproduced. The unusual stability of cellulose acetate markedly improves the permanence of the resulting colors. Many dyes and pigments which are not stable in other plastic materials can be safely incorporated with cellulose acetate.

If your products demand a material of unusual refinement—one that permits of delicate colors, opaque or transparent—use Eastman Cellulose Acetate. It is available in dry or paste form, or in solutions that may be controlled so that virtually any degree of flexibility or hardness may be obtained.

Prices and particulars will be sent on request

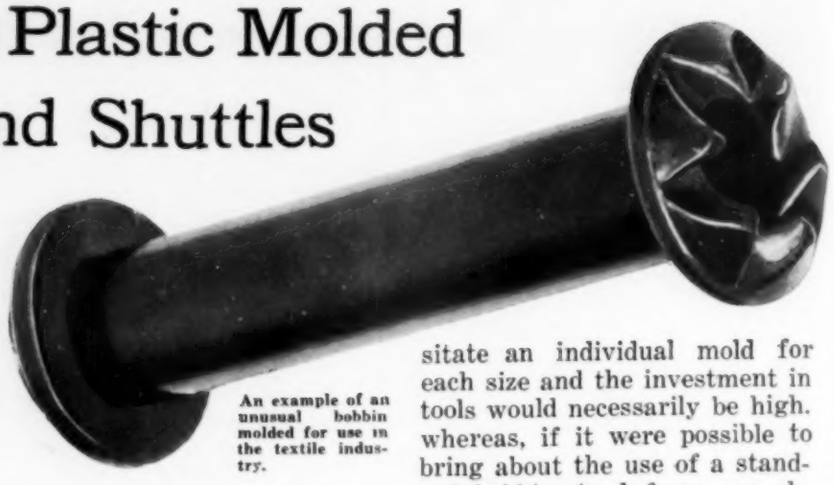
EASTMAN KODAK COMPANY

Chemical Sales Department Rochester, N. Y.

Long Life for Plastic Molded Bobbins and Shuttles

By P. C. Goodspeed

Boonton Rubber Mfg. Co.



An example of an unusual bobbin molded for use in the textile industry.

PROBABLY the most interesting development work now being carried on by this company is in applications of molded parts for the Textile Industry. Because of the diversity in the types of bobbins, shuttles, quills, etc., required and because of rigid requirements as to strength and finish, molds for these parts are necessarily complicated and it is necessary, in almost every case, to use a special molding material. In spite of this, the cost of the average part is no greater than the cost of the present wooden part and where the cost is greater a saving is effected due to the markedly increased life of molded parts over the old style wooden parts.

Replacement of Wooden Bobbins

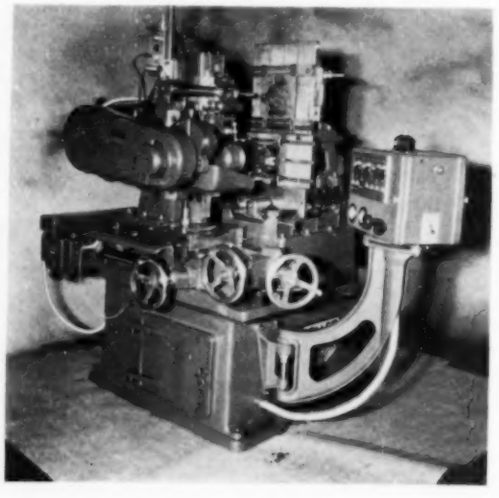
Almost ten years ago we made the first molded braider bobbins for the Narrow Fabrics Co. of Reading, Pa., and over a period of two years we supplied this customer with several hundred thousand bobbins to replace wooden bobbins and while at that time the cost of the molded bobbins was several times that of the wooden bobbins, this cost has been justified by the fact that today, amost ten years later, most of the bobbins are still in use.

The facts stated above, we believe, show that there is a definite place in the Textile Industry for molded products, and the response to our efforts along this line are most encouraging. However, before it will be possible to serve this industry to the best advtange it will be necessary to get the cooperation of textile manufacturers on the standardization of parts. For example, from a recent survey of the Braiding Industry we learn that bobbins are used in large quantities, that the present bobbins made of wood cause considerable trouble and waste from water and oil absorbtion causing the splitting of barrels and ends. These difficulties can be altogether overcome and the life of the bobbin indefinitely increased by the use of a molded product, but we are here confronted with a diversity of design. Even large manufacturers all using braider bobbins have as many distinctively different bobbins as to size. The difference in size would necessitate an individual mold for each size and the investment in tools would necessarily be high. whereas, if it were possible to bring about the use of a standard bobbin (and from our observations this is entirely practical) the tool cost for the group would be small in comparison to the output of bobbins, and the cost of bobbins themselves would be considerably less than if made from molds producing individual designs.

As with the braider bobbins so it is with the majority of other parts, a question of standardization, and through contact with the various manufacturers in this industry we hope to bring about at least the standardization of certain bobbin types, thus introducing the economies characteristic of resinoid molding mass production.

Keller Automatic Tool Cutting Machine

TO provide an automatic machine for a wide variety of die and tool work up to 12″x10″ and of particular interest to molders having their own toolrooms, the Keller Mechanical Engineering Corporation announces two small Automatic Tool Room Machines—Types G-1210 and GG-1210. These are designed for the rapid, accurate and economical production of such dies as trimming, blanking, piercing and extrusion and any odd-shaped work that can be milled from templates. The Type GG-1210 machine is supplied with a built-in jig boring device so that one may machine, locate, drill and bore to utmost precision in one setting.



These small Keller Automatic Tool Room Machines employ the same principles used so successfully on the larger Keller Machines.

TO MEET BUSINESS CONDITIONS AS THEY ARE TODAY WE OFFER THIS NEW SERVICE



What is your biggest problem? If it's **sales** we can probably be of considerable assistance. No ordinary, old-fashioned idea means much in these strenuous times. Success is a matter of new, fresh, hard-hitting, plus-value, methods, materials and merchandising.



You can't get away from the fact that new ideas make new markets—and American Insulator Corporation, America's most progressive custom molders, offer an exclusive merchandising service which will supply new ideas—ideas which will make new markets for you.



Perhaps you have been looking for new items to be marketed through your present sales channels. Our Sales Engineers and Merchandising Division is geared to render exceptional service along this line.



Improving the appearance of your product or its container will increase your sales. For there is no exception to the rule that when you add beauty to your product you add volume to your sales.



To meet business conditions as they are today requires expert service. Aico expert merchandisers study your needs—clever designers create new models—trained molding engineers suggest the right material—and one of the finest molding plants in the country produces your molded articles on time and to your most rigid specifications.



Write now for a preliminary conference—it may result in new profits for you.



AMERICAN INSULATOR CORPORATION

Molded Products of Every Description ❖ Phenolic and Cold Molders

LUMARITH ❖ BEETLE ❖ BRAYLITE

NEW FREEDOM, PENNA.

SALES OFFICES NEW YORK GRAYBAR BLDG. CHICAGO 9 S. CLINTON ST. DETROIT GENERAL MOTORS BLDG. BRIDGEPORT, CONN. 421 MEIGS BLDG.



WHY NOT MOLDED?

It would be a better frame—much lighter, and would probably cost appreciably less at the production line.

Use of molded plastics—Bakelite—Aldur—or Lumarith—eliminates all machining and finishing operations—insures accuracy and complete interchangeability.

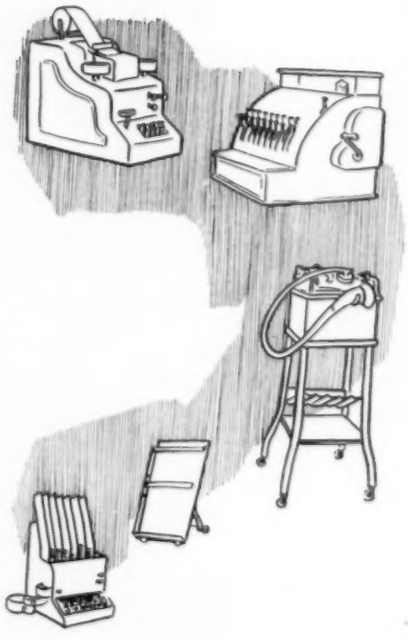
Boring, drilling, cutting, polishing, plating, painting or varnishing and their attendant costs are done away with. The part comes to you ready for the production line. The rich lustrous finish is complete and indestructible when the part comes from the mold.

Most any color—or beautiful, mottled combinations of colors.

Products made all or in part of plastics have a wide and potent sales appeal, because of their permanent, lasting beauty. Users like them.

Perhaps you don't make office equipment. But somewhere in your products, plastics will fit in to your advantage, and that of your customer.

Send us a sample of your product—or a drawing of a part—we'll duplicate it in plastics, or send you a sample of a similar product, together with estimates of costs.



REYNOLDS SPRING CO.

MOLDED PLASTICS DIV.

BAKELITE . . . . . ALDUR . . . . . LUMARITH

JACKSON . . . . . MICHIGAN

Electrically Conducting Molded Products Made from Pyroxylin

Graphite or other types of carbon bonded with cellulose nitrate plastics

IT seems almost paradoxical, but electrically conducting molded products are now being made. For years the word "molded products" was almost synonymous with "electrical insulation" but, as the industry makes progress, we now find that electrically conducting molded products are making their appearance. Metal has been replaced by plastic materials particularly where the insulating value of the plastic material was an essential feature, but it could hardly have been foreseen that so nonconductive a material as pyroxylin or similar cellulose esters, which have a high dielectric strength could be employed for producing molded articles that freely conduct the electrical current. It is evident that an entirely new line of development is thus opened up to the plastics industry.

The invention of electrically conducting molded products was made at the plant of the National Carbon Co., by Edwin F. Kiefer, of Cleveland, Ohio; being described in his U. S. P. 1,774,381; Aug. 26, 1930.

Resistors and Electrodes

The invention relates to electrically conductive articles fabricated by molding or otherwise forming a mixture of conductive powder and binder. Articles of this kind, which include for example brushes for electrical machines, contacts, resistors, and electrodes for electrolytic processes, must often possess a regulated degree of conductivity. The composition from which the articles are made should be adapted for molding, and the finished article should be permanent, resistance against highly corrosive agents being required for some uses. Other requirements such as those relating to strength, appearance, hardness, and ability to withstand heat must also be met in some instances.

Carbon brushes for electric motors molded with a celluloid cement as a binder, show very low resistance.

Copper or Alloys Can be Used

Kiefer has discovered that compositions in which the conductive powder is graphite or other form of carbon or metal or alloy, and in which the binder is a cellulose derivative, such as a cellulose ester or ether, are well adapted to the manufacture of a large variety of articles of the class referred to. Charring of the binder during manufacture of the article is not contemplated as this would destroy its binding properties and otherwise impair qualities which the invention aims to secure.

Cellulose nitrate is a suitable binder in many instances. The following examples will illustrate the invention as applied to brushes.

A blend of three parts by weight of powdered copper and one part of graphite (both being grades of these materials heretofore employed in making brushes) was prepared, and mixed with a solution of nitrocellulose sold by Du Pont as a celluloid cement and a thinner sold by the same company for use with said cement in the proportions of 100 grams of the powdered blend, 15 cc. of cement and 15 cc. of thinner. The whole was mixed thoroughly and dried by exposing it in thin layers to the atmosphere for one hour, and brushes were then molded from it under pressure. The brushes were permitted to stand for several hours and were then gradually heated to 150° C., which temperature was maintained for two hours. The physical properties of the brushes were as follows:

Apparent density 4.20.

Resistance 0.0001 to 0.0005 ohms per inch cube.

Scleroscope hardness 17 to 21.

Another batch was made up without metal powder, 100 grams of powdered graphite being mixed with 30 cc. of the celluloid cement referred to and 30 cc. of the thinner. The mixture was dried, molded (under 20 tons per square inch) and baked as before. The following physical characteristics resulted:

Apparent density 1.96 to 2.08.

Resistance 0.0006 to 0.0010 ohms per inch cube.

Scleroscope hardness 5 to 7.

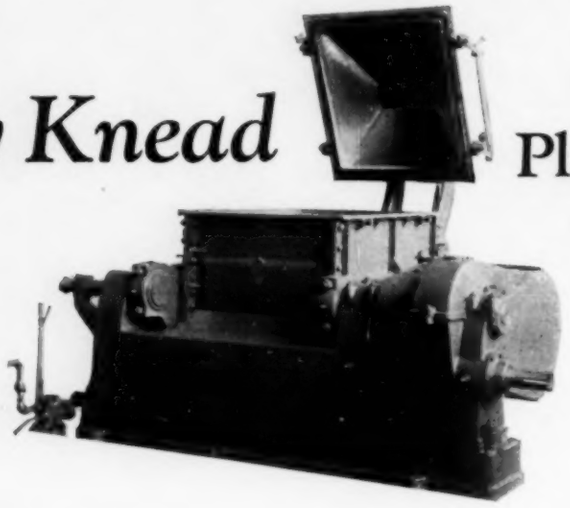
On test both the foregoing lots of brushes gave good results on small motors such as those used in toy railway trains, dictaphones, vacuum cleaners and household ice machines.

Many of the compositions embraced by the invention can readily be molded on metal studs, screws or the like to form contacts, and are suitable for such use.

There are but two claims; one of which reads:—

"1. A hard and conductive brush for electrical machines consisting of comminuted highly conductive material bonded with cellulose nitrate.

For *Every Knead* In the Plastics Industries



Size 16—working capacity 150 gals. Trough and cover raised and lowered by hydraulic hoists with automatic valves; roller bearings; jacketed trough; herringbone gears running in oil.

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SIMILARLY, Baker Perkins machines have been developed for and are being used by the leading manufacturers of synthetic resin compounds (phenol, urea, thio-urea, etc.) cold molded insulation, asphalt compounds, rubber and fibre compounds,—practically every product of the Plastics Industries.

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NEWS *of the* INDUSTRY

Three Casein Units Merge Into American Plastics Corporation

THREE of the most significant factors in the American casein plastics field have merged their interests and will continue to do business under the name of the American Plastics Corporation. The units involved in the combination are the former Erinoid Company of America, the Karolith Corporation and the Panplastics Corporation.

The new company acquires all the business and assets of the three units, the principal advantage to be expected of the merger being a greater and prompter service to the users of casein plastics. Production will be concentrated at Bainbridge, N. Y., and to a lesser degree at Garfield, N. J. The Long Island City plant will be abandoned. Offices of the new company are 50 Union Square, New York City.

The officers of the new company are:

Mr. William Callan, Chairman of the Board; Mr. George Simon, President; Mr. Leo Karpen, Vice-President; Mr. E. F. Miller, Treasurer; Mr. F. William Weckman, Secretary.

The Board of Directors includes Mr. William Callan, Dr. Henry V. Dunham, Mr. M. J. Norton, Mr. George Simon, Dr. W. Ost, Mr. F. William Weckman, Mr. Leo Karpen, Dr. L. V. Redman, and Mr. A. S. Zimmerman. Mr. Charles S. Lawrence, Jr., will be in charge of sales.

Monsanto Chemical Works

NET profit of the Monsanto Chemical Works and subsidaries for 1930 was equal to $1.80 a share on the capital stock, against $4.25 a share in the previous year.

Wood Flour Duty Reduced

PRESIDENT Hoover invoked the inflexible provision of the Hawley-Smoot tariff in reducing, among other items, the duty on wood flour. In fact, the Tariff Commission recommended, and the president approved, a reduction in the rate below not only the existing rate but also below that of the Fordney-McCumber tariff of 1922. Wood flour can now be imported with a duty of 25% ad valorem added. Most of the imported product comes from Norway.

Bakelite Wins Harvard Advertising Awards

"THE Jury for the Harvard Advertising Awards, founded by Edward W. Bok in 1923, has conferred upon the Bakelite Corporation the award for the best "Industrial Products Campaign" in 1930. This award reads as follows: "To Bakelite Corporation for an Industrial Campaign, with recognition to Allan Brown and Rickard & Company, Inc."

The advertising awards were created by Mr. Bok to encourage merit and stimulate improvement in advertising as one of the greatest and most important forces in modern life. To the end that truth shall be recognized as a factor of most practical value in advertising, the juries charged with making the awards have been instructed to lay particular stress upon accuracy and fair statement.

Each year the jury meets in Cambridge the latter part of January to consider the material submitted by advertisers and advertising agencies, and that gathered by the school. In the 1929 competition, about 12,000 advertisements were submitted. The number for this year was anticipated to be even greater.

Celluloid Corp. Advances Executive Officers

W. STUART LANDES was elected president of The Celluloid Corporation, succeeding John A. Stephens, who resigned a month ago.

At a meeting of the board of directors, Mr. Landes, who is thirty-eight, was advanced from the position of vice president and works manager.

Harold I. Hill, for some years secretary and treasurer of the corporation, was elected vice president in charge of finance. He will continue as secretary also.

O. C. Schiffman was named assistant treasurer. Arthur E. Petersen, heretofore assistant to Mr. Landes in directing plant operations, will be advanced to the position of works manager.

Dr. Camille Dreyfus, president of the Celanese Corporation of America, of which the Celluloid Corporation is a subsidiary, was elected chairman of the board of directors of the local corporation, the executive offices of which are at 290 Ferry Street, Newark, N. J.

Charles F. Reeves, vice president in charge of sales, who with Messrs. Landes and Hill composed a committee directing the affairs of the corporation in the interval since the resignation of Mr. Stephens, was elected a directeor of the corporation, as was George Schneider of Montclair. The latter fills the vacancy caused by the death of Theodore F. Merseles.

Commercial Solvents

REPORT of the Commercial Solvents Corporation for 1930 showed net profits after all charges of $2,717,000, equal to $1.07 a share on the no-par value stock compared with $3,667,402, or $1.50 a share, in 1929.

Burroughs Co., Pioneer Press Manufacturers, in Receivership

John A. Grammer of Newark New Jersey has been appointed receiver for the Burroughs Company, manufacturers of hydraulic machinery, upon complaint of M. E. Gengenbach.

The Burroughs business was originally started over fifty years ago under the name of the Charles Burroughs Company and subsequently as the Composition Machinery Company. It was incorporated under New Jersey laws in September 1919 with an authorized capital of $100,000 and in September 1921, changed its name to the Burroughs Composition Machinery Corporation and then to the Burroughs Company in April 1922. Charles F. Burroughs was president and treasurer of the company; Walter E. Rahm, vice president; and the complainant, secretary. Among others who have been identified with the company at some time were John Burnhard and Frederick Hagner.

Du Pont Viscoloid Withdraws From Duplate Corporation

THE Du Pont Viscoloid Company has withdrawn, as of February 3rd, from participation in ownership of the Duplate Corporation, the complete control of which has been acquired by the Pittsburgh Plate Glass Company.

According to a statement made by C. K. Davis, president of the Viscoloid Company, "this action has been prompted by the fact that our principal business is the manufacture and sale of Pyralin and we now feel that our maximum service to the safety glass industry can best be rendered by concentrating our efforts in this particular field. We have the utmost confidence in the continued success and growth of the safety glass industry as great progress has already been made by manufacturers in perfecting this product and in having it accepted as an important contribution to public safety."

Wilckes and Swann Corp. Join Their Forces

Wilckes, Martin, Wilckes Company of Camden, N. J., manufacturers of lamp blacks and phosphates, has merged with the Swann Corporation of Birmingham, Ala., holding company for a number of subsidiaries operating in the chemical field. Wilckes, Martin, Wilckes offices will be combined to those of the Swann Corporation, Graybar Building, New York City.

Bakelite Artist—Consultants

BAKELITE Corporation announces further additions to the previously published list of artist-consultants who are studying the problems of conforming the design of a molded part to the production possibilities of the molding process. Their names are as follows:

Mr. Walter D. Teague, 210 Madison Avenue, N. Y. C.

Mr. C. O. Woodbury, 210 Madison Avenue, N. Y. C.

The services of these authorities are available to anyone who wishes designs, or advice on the development of designs, which are practical from the molder's standpoint.



Dunlop Memorial Statue is of Ebonite

STATUES made from hard rubber are a practicable possibility of the future as a result of tests carried out by the technical staff of the Dunlop Rubber Co., Fort Dunlop, England, for the memorial tablet to the late J. B. Dunlop, inventor of the pneumatic tire.

The memorial, which was recently unveiled in Belfast, Ireland, was made from a solid block of ebonite weighing 270 lbs., of which 70 lbs. was removed by the sculptor in chippings and shavings. The block was built up in Dunlop's Macinlop factory, Liverpool, from layers of unvulcanized ebonite under a roller weighing 560 lbs., and trimmed to fit a special steel mold where it was placed under pressure of 250 tons and "cooked" for more than 110 hours. The Dunlop experts are confident that the memorial will withstand the severest atmospheric changes.

Durez is Packed in Newer Drums

DUREZ molding compound is now packed in a heavier steel drum, made stronger by heavy center bevels. The outside surface of the cover or top is smooth, therefore easily kept clean and will not collect dust or when left out-of-doors, water. The entire top lifts off so that the drum may be easily emptied into a pilling hopper and all contents poured out. A paper liner protects the compound from possible contamination.

As the drum is made of steel and welded together, there is no possibility of drum particles getting into the material. The metal drum head is lined with wood and permits a well sealed and secure head when fastened into place.

Instruction in First Aid at Monsanto

A first-aid training school was recently conducted in Monsanto, Illinois, for the employees of the various industries in that community. It was held under the auspices of the Bureau of Mines of the U. S. Department of Interior. Monsanto Chemical Works, Evans-Wallower Zinc Company, Sterling Steel Company and Lubrite Oil Refinery sent representatives, totaling forty. The students were instructed in controlling bleeding, making dressings, applying artificial respiration and relieving shock.

At the fifth session, held on Friday, December 19th, certificates were awarded and first-aid manuals presented to those who had completed the five-day course.

All of the classes were held in the Monsanto City Hall, the use of which was kindly permitted by the village board.

Die Chemische Industrie des Deutschen Reiches 1930-31

Compiled and edited under collaboration of representative chemical societies. Published by Verlag für Börsen-und Finanzliteratur A. G., Berlin, Ger. 900 pages, clothbound, price RM. 25.00.

THIS directory on the chemical industry of Germany appears after a number of years in its seventh completely revised and greatly enlarged edition. It brings again: the biographies of all important chemical manufacturing enterprises, to which 200 new firms have been added; an index of these firms classified according to their products, comprising 29 groups; a trade name and trademark list of chemical firms, and an index giving sources of supply for raw materials and technical products.

The directory is doubtless one of the most complete of its kind and should be of value to every one having business relations with or desiring information on the chemical industry in Germany.

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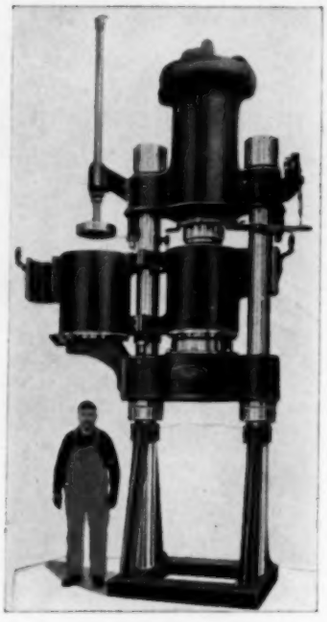
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Banbury Mixer

BESIDES its extensive use in the rubber industry, where it has become an indispensable unit for the mixing and compounding of rubber with filling powders, the Banbury Mixer is finding an expanding field of usefulness in the working of a number of different kinds of heavy plastics.

In the plastics field Banbury Mixers are producing for their users large savings in power, labor, floor space, material handling and compound costs in the manufacture of linoleum, heavy asphalt compositions, roofing materials, shellac compounds, bakelite and phenolic condensation products.

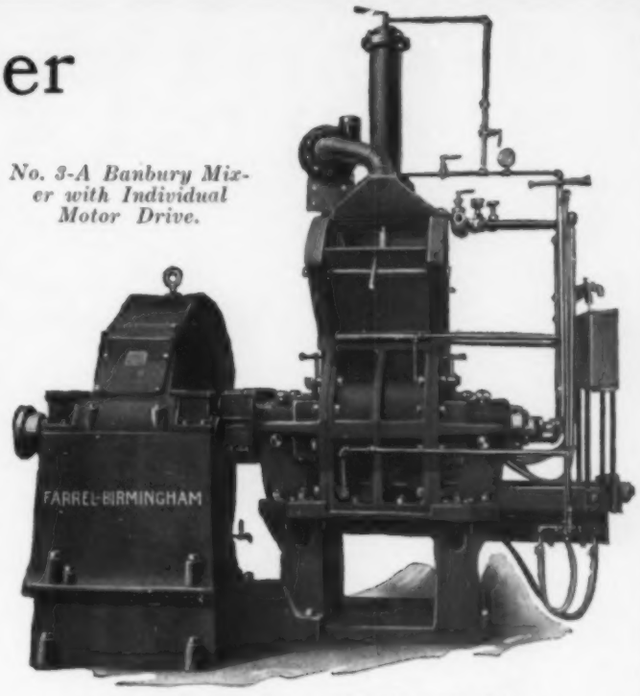
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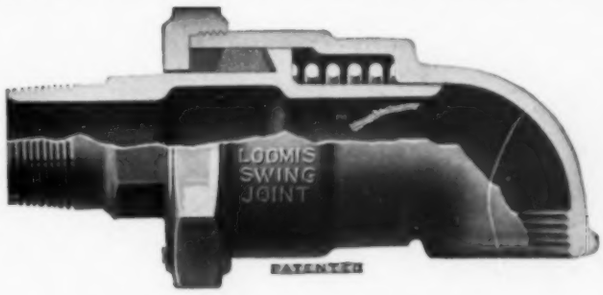
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CANASTOTA, NEW YORK

Ornamental Effects With the Artificial Plastics

By Charles W. Rivise

In the January issue, p. 13, present article began. Continuing from p. 15 of that issue we find some additional patents disclosing methods of producing ornamental and artistic effects.

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20. R. Piogey. 1,263,284; April 16, 1918. A substitute for tortoise shell, amber, ivory, etc. suitable for buttons and combs is made by melting gelatin or glue, treating with hop flower concoction containing oxalic acid, sheeting or forming into stacks and finally immersing in bath of formaldehyde, oxalic acid, tannin and glycerol.

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21. A. W. C. Van Voorhout. 1,271,392; July 2, 1918. Filed Dec. 22, 1916. Product suitable for objects of art and imitation amber is made as follows:—Equal parts of a phenol such as cresol which has been made colorless and transparent by distillation or crystallization, or pure phenol and formaldehyde solution are heated together with 0.5% solid potassium hydroxide until all the free water originally present has been driven off as well as about one naif the water formed in the reaction. Ethyl or methyl alcohol are then added to retard the reaction; half the alcohol is distilled off; the mass is poured into molds and the mass heated in a current of air rising by steps from 60° to 120° C. The caustic alkali may be first dissolved in the cresol and the formaldehyde then added. Product is transparent. To produce opaque product, impure cresol is added and instead of alcohol, oil of turpentine (1 to 4%) and glycerine (2 or 3%) are added with or without a coloring material such as fuchsin, ruby red, deep black (hard rubber imitation) methyl blue or methyl green and a trace of vaseline to facilitate removal from the mold. The temperature must be raised to 180° C.

Not only for the articles of mere utility have the synthetic resins been employed. The industries that demand ornamental and artistic results are also becoming more and more dependent upon the new products that the chemist is creating in his laboratories.

We are indebted to our Advisory Editor for expending much time and well-applied effort in collecting these patents.

It would take weeks at Washington to locate these —and here they are all sorted out for you.

22. L. T. Frederick. 1,284,644; Nov. 12, 1918. Filed Nov. 25, 1914. Decorative material suitable for billiard cues and canes is made as follows: A number of strips of paper or cloth some of which have been coated or impregnated with a phenolic condensation product that has been dyed black, some of which have been treated with light brown binder, and others of which have been treated with colorless binder are stacked on edge, the dark sheets being interposed between light sheets and being of different thicknesses. The stacked strips are then twisted or distorted to give any desired effect and then heated to consolidate the material. Rods simulating polished and grained wood may be made by pressing strips together without distortion or heat and pressed in circular mold, the strips having first been cut into proper width if necessary.

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23. M. Pontio. 1,293,101; Feb. 4, 1919. Ornamental and artistic objects such as statuettes, bases, trays, dishes, dolls heads, etc. may be made by molding the composition made as follows:—Casein is dissolved in boiling water rendered alkaline with caustic soda or ammonia. Then are added sheet gelatin, gum arabic, mineral powders and coloring materials. The gum arabic must previously have been dissolved in hot water and filtered. The product is hardened with formalin.

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24. L. V. Redman, A. J. Weith & F. P. Brock. 1,310,087. July 15, 1919. Filed Sept. 16, 1918. Ground mica or fish scales is incorporated into a phenol condensation product to produce a shimmering effect. The synthetic resin may be made by boiling together at atmospheric pressure a solution of formaldehyde and phenol or cresol taken largely in excess of the formaldehyde, until the formaldehyde is substantially eliminated from the supernatant layer; discarding the aqueous layer; mixing a solution of formaldehyde and a small amount of hexa with the gummy mass and concentrating below 100° C. The product may be poured into molds, set below 100° C; removed from the molds and hardened by heat treatment below 100° C either at, below or above atmospheric pressure followed by heating a short time above 100° C.

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25. J. R. McClain. 1,343,216. June 15, 1920. Division of Patent 1,299,747. A finished surface for a desk, table, sideboard, etc. is produced as follows:—A sheet of fabric such as paper, textile or felt such as cotton batting, embodying desired color or figure design, which may

be due to incorporation of sheets of fabric having color or design thereon, or due to color added to binder, is dried wholly or partially, applied to the article of furniture and finally compacted by oiled metal plate to insure smooth polished surface.

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26. L. V. Redman, A. J. Weith and F. P. Brock. 1,345,694; July 6, 1920. Filed Sept. 16, 1918. A material suitable for pipes, pipe stems and cigarette holders is made by incorporating mica or fish scales in a phenol condensation product made by boiling together approximately three parts of a forty per cent solution of formaldehyde and five parts of phenol or cresol. The method of hardening and molding is similar to that described in Patent 1,310,087.

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27. L. V. Redman, A. J. Weith and F. P. Brock. 1,345,695; July 6, 1920. Filed July 24, 1919. Produces shimmering effect by introduction of mica or fish scales as disclosed in Patents 1,310,087 and 1,345,694.

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28. L. V. Redman, A. J. Weith and F. P. Brock. 1,374,526; April 12, 1921. Filed Sept. 16, 1918. Ground mica or fish scales is incorporated into a phenol condensation product to produce a shimmering effect. The synthetic resin may be made by boiling together equal parts of 40 per cent solution of formaldehyde and a phenol or cresol without the use of a condensing agent, until there results a thick viscous gummy ungelatinized lower layer and an aqueous upper layer containing approximately 10 per cent of formaldehyde; discarding the aqueous layer and concentrating the mass; introducing into the mass if necessary a smal ladditional amount of formaldehyde to replace any loss during boiling; pouring the mass into molds and heating below 100° C until the material becomes set; then removing the mass from the molds and heating to infusibility below 100° and then heating for a short period above 100°. The concentration may be performed in vacuo and the hardening may be done in vacuo, at reduced pressure, at atmospheric pressure or at higher pressure.

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29. H. Plauson. 1,395,729; Nov. 1, 1921. Ivory-like tone is imparted to composition suitable for buttons and knobs by incorporating fillers such as kaolin, heavy spar, chalk or talcum. The composition itself is made by dispersing a protein such as blood, yeast, hemoglobin, casein or fish protein in a non-solvent organic medium and employing the colloidal dispersion or organosol as a binding agent for dried protein powder.

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30. E. E. Novotny. 1,398,143; Nov. 22, 1921. Filed Dec. 11, 1919. Discloses printing colored designs on laminated product consisting of sheets of fibrous sheets such as long fibered chipboard, blotting or Yoshino paper impregnated with a phenol formaldehyde resin varnish. Skin-like coating may be formed on composite sheet.

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31. L. V. Redman, A. J. Weith and F. P. Brock. 1,424,738; Aug. 1, 1922. Filed Sept. 8, 1921. A composite slab suitable for making cigar holders, cigarette holders, pipes, etc. is produced as follows:— Several slabs of transparent phenol condensation product are united by coating the surfaces to be united with an acetone and/or alcohol solution of phenol condensation product, allowing the surfaces to dry, clamping them securely together and subjecting them to heat. The individual slabs may be of different colors. Variegated effects may be produced by dovetailing the plates of different colors together or by adding a different color to the lacquer than that of the slabs to be united. In the latter case two colored effects can be produced.

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32. G. Martin. 1,429,360; Sept. 19, 1922. Filed Aug. 27, 1921. A China or porcelain substitute suitable for dishes is made by mixing a phenol solution of casein with a mixture of equal parts of white shellac and flake white and allowing to stand. Copal or white sand may be incorporated to impart a coarse texture and bluing to give bluish whiteness of China. The article after it is molded is treated with formaldehyde and rubbed with a cloth to give it a luster.

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33. N. S. Clay. 1,454,845; May 15, 1923. Filed June 25, 1919. An ornamental article is made as follows: A sheet of paper or fibrous material provided with a fanciful design is interposed between sheets of translucent tissue impregnated with a phenolic condensation product, assembled with a base of laminated duck impregnated with condensation product and cured between platens or in a mold. In case of curved or irregular base the design sheet and its protective layers may first be preformed by slight pressure against impregnated body protected with unimpregnated paper. The design may be colored and may simulate the grain of wood.

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34. H. N. Michaelsen. 1,454,939; May 15, 1923. Filed Jan. 7, 1920. A varicolored article illustrated as an insulating panel for an electric meter is made in the following manner: A partial reaction product of phenol and formaldehyde is placed into a mold of irregular contour in irregular masses so as not to cover entirely the bottom of the mold; a differently colored partial reaction product is placed over the first mentioned product and so as to cover the portions of the mold not already covered and heat and pressure is applied to consolidate the mass. The molding materials may be black and brown condensation products in the form of powder or sheets or in both forms and may contain fillers. Inserts may be molded into the article as is usual in the art.

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35. A. C. Lindauer. 1,459,541;

June 19, 1923. Ornamental articles such as combs, buttons, mouldings, toilet seats, drawer pulls are made from sawdust, wood chips, wood pulp, cellulose, filings, earths, minerals, etc. bonded with blood albumen glue made as follows:—Blood albumen is soaked in cold water, dissolved by stirring and then ammonia and trioxymethylene or paraform added successively.

H. C. Egerton 1,475,623; Nov. 27, 1923. Filed Mar. 6, 1919. Discloses a phonograph horn of the flaring flower petal type made of laminated fabric united with Bakelite, Condensite or Redmanol, the outer layer of which may have an absorbent exposed surface so that it may be decorated by a design which may be knit, stencilled, or painted thereon or which may be made by superimposing layers of netting, lace or other figured open work fabric of contrasting color.

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37. W B. Allen 1,477,096; Dec. 11, 1923. An interior wall finish is made by mixing casein, alkaline substance such as borax or ammonia, hydrated lime, mica, oxide of zinc. China clay and coloring matter.

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38. C. Ellis 1,482,357; Jan. 29, 1924. Filed Sept. 26, 1922. A pure white casting resembling porcelain and suitable for cigarette holders, pipe bowls and stems, knife handles and beads is made as follows: Urea and formaldehyde are mixed and an alkali as caustic soda is added to start the reaction. As soon as the mixture becomes turbid a mild acid as acetic is added to check the reaction. The setting of the solution is brought about by the addition of a strong acid or acid salt as bisulphate or aluminum chloride. The following fillers and modifying agents may be added: glycerine, casein, gelatin, China clay, silex, quartz, titanium oxide, flock, wood flour, asbestos, dyes, pigments, etc.

39. C. Ellis 1,482,358; Jan. 29, 1924. Filed Sept. 29, 1922. This patent differs from Patent 1,482,357 in that a polymerized formaldehyde such as paraform is employed instead of formaldehyde and that cotton flock, blue dye, whiting, gypsum, barytes, Portland cement, zinc sulphide or radium paint may be incorporated into the product.

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40. P. J. Ariente & L. Flick 1,495,146; May 27, 1924. Filed June 29, 1923. An ornamental fabric suitable for dress goods and which can be laundered in boiling water is made as follows: A web of woven, knitted, netted, felted or leather fabric is led by means of a backing between two cylinders, the upper one of which is a perforated stencil cylinder containing a liquid or pasty phenol plastic with or without camphor gum and or a pigment or coloring material. Ornamentations are in the form of beads in desired designs and are fixed and hardened by passage through a drying apparatus.

Editor's Note:—Mr. Rivise's review will be concluded in the April issue of Plastics & Molded Products.

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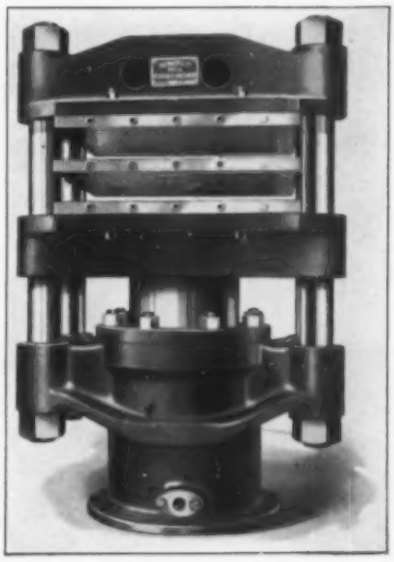
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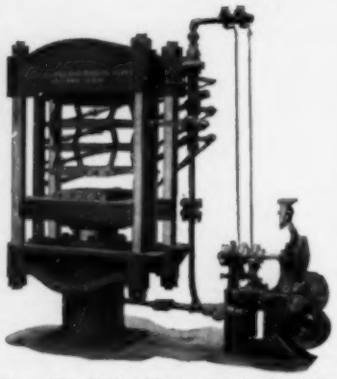
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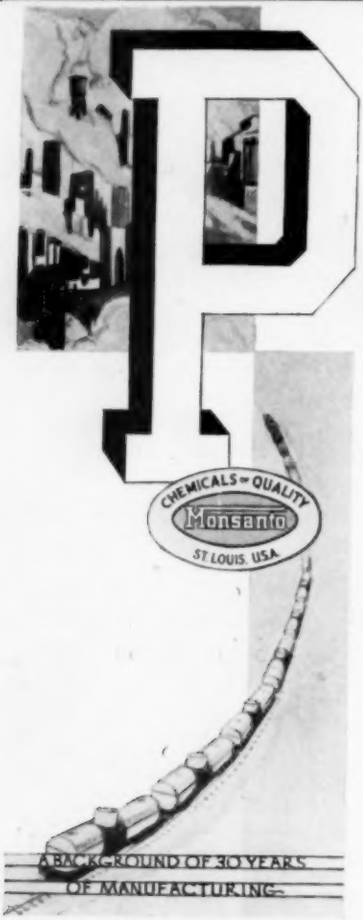


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Brilliantly White Resinoids from Urea

Dr. Kurt Ripper contributes another invention along the line of his chosen line of research in the amino-plastics

DR. KURT RIPPER, who for a long time was associated with Dr. F. Pollak in the development of the earlier types of aminoplastics, has contributed many of the outstanding improvements in this type of condensation products. While some of the earlier types of aminoplastics aimed at the production of transparent products, known as POLLOPAS, there has also grown up a demand for the production of brilliantly white opaque products. This was usually attained by the use of pigments, but this very greatly increased the weight of the products and also usually diminished the breaking and shock resisting strength. Dr. Ripper has solved this problem by so conducting the condensation and polymerization of the products so as to leave therein very tiny bubbles, which make the materially very brilliantly white. The product is mainly intended as an artificial meerschaum, for art purposes and in general where a synthetic white resinous condensation product is required. The material is not thermoplastic when finished, and requires machining.

A Casting Resin

As described in his recently issued U. S. P. 1,779,047; Oct. 21, 1930 he proceeds as follows:

The processes hitherto known for the manufacture of condensation products by the action of aldehydes, particularly formaldehyde, on urea or derivatives of urea aim primarily at the production of crystal clear, water bright, vitreous artificial composition. The same initial materials afford however, the possibility of producing cloudy products of an opalescent to chalk white appearance. If these cloudy compositions have also a porous structure imparted to them, products resembling meerschaum can be obtained.

In the guise of a patent specification, the inventor really presents a detailed scientific article on the urea resins, which are becoming of increasing importance in the plastics field.

The processes hitherto suggested for this purpose are carried out in such a way that they permit the reaction between urea and formaldehyde to proceed under such chemical conditions that a white product is formed from the very commencement in the mixed solution. The resin solution which is rendered cloudy or milk-like by this white product is then converted into a coarsely porous cloudy product by whisking it up and allowing it to solidify rapidly. These hitherto known processes have the disadvantage that they depend upon the observance of certain chemical conditions in the initial solution. Furthermore the porous texture of such compositions is irregular owing to the rough mechanical manner of its production and blister-like excrescenses are exhibited.

The object of the present invention therefore, is to provide a process by the aid of which, independently of the raw materials, cloudy and perfectly homogeneous porous compositions with a determinable size of pore can be produced. It has been found that this can be done in a surprisingly simple manner if the initial condensation product is first prepared in the usual manner, the porous structure being afterwards produced merely by colloidal chemical action of the subsequent gelantinizing process, the interstitial spaces between the pores approximating to the order of magnitude of the wave length of light, or exceeding it, after which hardening is effected and the porous structure readily maintained.

Three Stages of Condensation

It is known, that the process for the production of condensation products of urea takes place in general in three stages. The first stage yields a more or less viscous condensation product of the character of a sol. In the second stage gelatinization takes place and in the third stage the mass is hardened by the expulsion of the dispersion medium still contained in the jelly.

By the aid of this invention it is now possible through the colloidal chemical action of the gelatinizing process taking place in the second stage, to vary the density of the gelatinous material produced, as may be desired. To influence the gelatinizing process any means known to colloidal chemistry for this purpose may be used. As however, the colloids do not behave uniformly for the various influencing methods which may be employed, the most favourable

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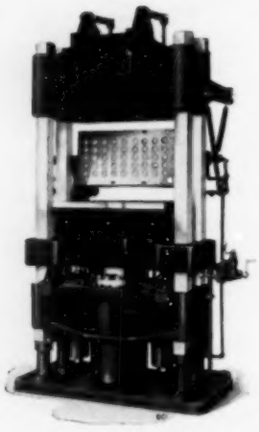
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means should be selected according to the particular condensation product provided by the first stage and according to the degree of cloudiness and the size of pores desired. Further considerations to this end, such as the use of definite concentrations, certain temperatures, and the addition of suitable colloidal chemically active substances are also involved.

Whereas, for example, in the manufacture of glass clear artificial masses or compositions the tendency was to expel the dispersion medium as completely as possible prior to gelatinization, according to this invention compositions rich in dispersion medium are allowed to gelatinize, so that a jelly with a less dense texture is produced, in which pores of suitable size are produced by the subsequent removal of the dispersion medium.

Porosity and Gelation

In order to prevent the jellies rich in the dispersion medium from compacting together again during subsequent hardening, the resin composition rich in the dispersion medium is preferably hardened simultaneously with gelatinization to such a degree that the jelly produced will have imparted to it the desired porous structure during the final hardening by the expulsion of the water or other dispersion medium, and will suffer no appreciable amount of shrinkage. This hardening may be effected by the action of added substances which have a coagulating effect or by the use of a higher gelatinizing temperature, or by the joint of these two means.

In this way it is possible to so increase the interstitial spaces (which in the glass clear compositions can scarcely be perceived even with the best artificial aid and are far below 0.3 μ) that the composition loses its glass clear transparency. The pores thus formed are not visible to the naked eye, as their order of magnitude lies approximately between 0.4μ and 4μ. If

the size of the pores reaches that of the wave length of light, the product obtained appears opalescent. If the size of the pores be still further increased, the product appears cloudy to a still greater degree, until finally, when the size of the pores exceeds 1μ it assumes a snow white appearance. The size of the pores is adjustable arbitrarily by means of the present process.

The process yields a great number of different artificial compositions, which can all be used as materials for turning. As the pores contained in them are not visible externally, the materials can be highly polished. They partially resemble meerschaum and partially formaldehyde casein compounds and even opal.

Examples of the ways in which this invention may be carried out are as given below:

1. According to the process described in the specification of British Patent No. 213,567 a hydrophile condensation product is produced from 75 parts by weight of carbamide and 200 parts by weight of formaldehyde said product comprising about 275 parts by weight. As described in the specification of British Patent No. 193,420, so much of a formaldehyde fixing medium is then added as corresponds to the free formaldehyde present and then one part of concentrated formic acid is added. After thoroughly mixing, the condensation product which contains 300 grammes of carbamide in 1000 cubic centimetres it is allowed to stand for some time at ordinary room temperature so that the bubbles may rise, after which the mass is brought to a temperature of 40 degrees C. After from 8 to 10 hours the originally water clear and perfectly bubble-free solution will be found to have solidified to a milky jelly the cloudiness of which continues to increase. After from 1 to 2 days the white jelly is removed from the mould, if necessary cut up and afterwards hardened under such conditions that collapse

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of the loose gelatinous structure cannot take place. This hardening may be effected for example by keeping the jelly in a cool place(at a temperature below 30 degrees C.) until it has given up the greater part of the water. In this way the jelly acquires the necessary strength to prevent any collapse of the particles on rise of temperature, or as the case may be to avoid any clarifying at any portions that may collapse. A snow-white meerschaum-like composition is obtained.

2. Instead of the gelatinization and hardening of the resin composition obtained from 75 parts by weight of carbamide and 200 parts by weight of formaldehyde as in Example 1 by the addition of one part by weight of concentrated formic acid at 40 degrees C., the same quality and volume of resin composition may be gelatinized and hardened by the addition of 0.1 part by weight of formic acid at 70 degrees C. After from one to two days the snow white jelly is removed from the mould and further treated as in Example 1.

3. If 10 per cent of water be expelled from the 275 parts by weight of the liquid condensation product in vacuo (whereby the concentration of the resin is so raised that in about 1000 cubic centimetres of the resin there are present 375 grammes of carbamide) and if the gelatinization and hardening be carried out exactly as in Example 1 or 2, slightly denser materials are obtained which however, do not possess the perfect white cloudiness of the products obtainable according to Example 1.

If still more liquid be distilled off so that the concentration is still further raised, completely homogeneous opalscent products are obtained.

4. Instead of commencing with a hydrophile condensation



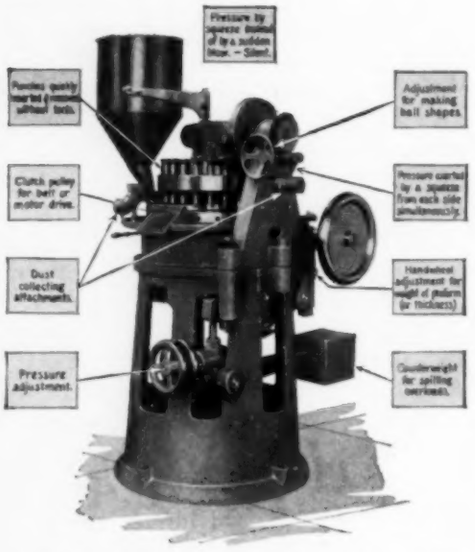
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product, hydrophobe condensation products produced from urea and formaldehyde according to the process described in the specifications of British Patent No. 213,567 or British application 4,598/26 may be employed. In this case the resin composition must have a certain amount of dispersion medium added to it prior to its gelatinization. For this purpose 100 parts by weight of hydrophobe resin are mixed with 30 parts by weight of alcohol. After adding 0.5 parts by weight of phosphoric acid the mass is intimately mixed, poured into a mould and allowed to gelatinize at 50 degrees C. After standing for 24 hours at this temperature the jelly is removed from the mould and allowed to stand by itself at a temperature not exceeding 20 degrees C. After the main portion of the alcohol and water have been driven off the mass can be hardened finally at any desired temperature.

Fillers

All these compositions may have incorporated with them during their manufacture or, owing to their porosity, even after manufacture, all kinds of organic or inorganic materials liquid, solid, dense or fibrous which are capable of suitably affecting the quality of the final product.

The products of the present process possess according to the degree of white cloudiness which corresponds to their porous structure, a smaller or larger apparent specific gravity which lies between 0.5 to 1.2. The artificial compositions so obtained can be mechanically worked in a most excellent manner, that is to say they can be filed, bored, milled and polished. Owing to their porous structure they possess a great power of taking up both liquids and gases.

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Color Matching Device Uses Molded Bakelite Housing

Arcturus Photolytic Cell Used to Detect Slightest Variation in Color of Paints, Papers, Inks, Cloths and Plastics



New York Herald-Tribune Photo

THE use of a photo electric cell in a color matching device now displayed at the Exhibition on Color, Museum of Science and Industry, New York, demonstrates in interesting fashion the manner in which an application of phenol resinoid may become of direct assistance to the plastics industry in the scientific production of colored molding materials.

This color tester consists of an Arcturus P-4 Photolytic Cell, housed in molded Bakelite material, and connected to a one-stage vacuum tube amplifier using a Type 612-9 Arcturus Tube. The visor of this cell is constructed with a conical shaped reflector to shield all extraneous light. A series of miniature lamps are mounted within the reflector and throw a beam of light on the color object to be tested.

In operation, the sample under test is brought up to the opening of the visor and the reflected light from the sample falls on the photolytic cell. The amount of light thus reflected by the sample is indicated by a microammeter in the output circuit of the amplifier.

It is essential that the surfaces of the comparative samples to be tested are of the same finish or texture. In order to obtain accurate results it is necessary to have the test sample in the same position with relation to the sensitive surface of the cell.

This apparatus is capable of detecting the slightest variations of shades of the same color, far beyond the capabilities of the human eye.

A rather unique test to which this equipment was applied was the standardization of density of rouge on the cheeks of a group of chorus girls. It was possible with this device for all the girls in the chorus to have a uniform rouge shading.

In general practice, the device can be applied to matching colors of paints, papers, inks, cloths, plastics, etc.; in fact, almost any commodity manufactured.

Molders Section Completes Work on Uniform Accounting Manual

THE first 1931 meeting of the Molded Insulation Section of the National Electrical Manufacturers' Association was held in Buffalo, New York, on Friday, January 16. One or two of the members arrived a day ahead but most of the men arrived early Friday morning and met at the Hotel Statler for breakfast. At ten o'clock the meeting was called to order in one of the parlors by Mr. Aumend of NEMA who pointed out that Mr. Sylvester, Chairman of the Section, was absent owing to a death in his family. Therefore the motion was made and carried that Mr. R. A. Allen serve as Chairman Pro-tem and Mr. Allen took over the chair.

Proceeding, then, with the business of the day, the Section after discussion decided to continue the collection of data on closed transactions. By way of providing an index of current business, the Statistical Department of NEMA asked the Section if they would care to have a graphic chart prepared monthly indicating the volume of business for the period, and for comparative purposes, a curve for the same period during the previous year. The Section approved this suggestion also.

Mr. B. Victor Sammet, Northern Industrial Chemical Co., reporting for the Uniform Accounting Committee, stated that the committee had practically completed its work and that the Manual which it was preparing was ready for distribution to the members of the Section. He outlined the method of distribution and the manner in which the Committee arrived at the cost of the book. The Section tendered a rising vote of thanks to the committee for the commendable manner in which they had carried on their program, as well as in anticipation of their future efforts.

The formal morning session was concluded with routine

reports of various other committees, after which luncheon was held at the hotel. The afternoon was devoted to informal discussions, mostly around the famous indoor golf course of the Hotel Statler.

Officially, no one organization acted as host for the meeting and subsequent entertainment, but inasmuch as transportation to the General Brock was handled by the men from General Plastics, it should be said that they were at least the unofficial host during the evening. Dinner was held at the Brock and owing to the pressure of business, most of the members returned to Buffalo at ten o'clock, in order to get trains for New York, Chicago and way points. Those present were:

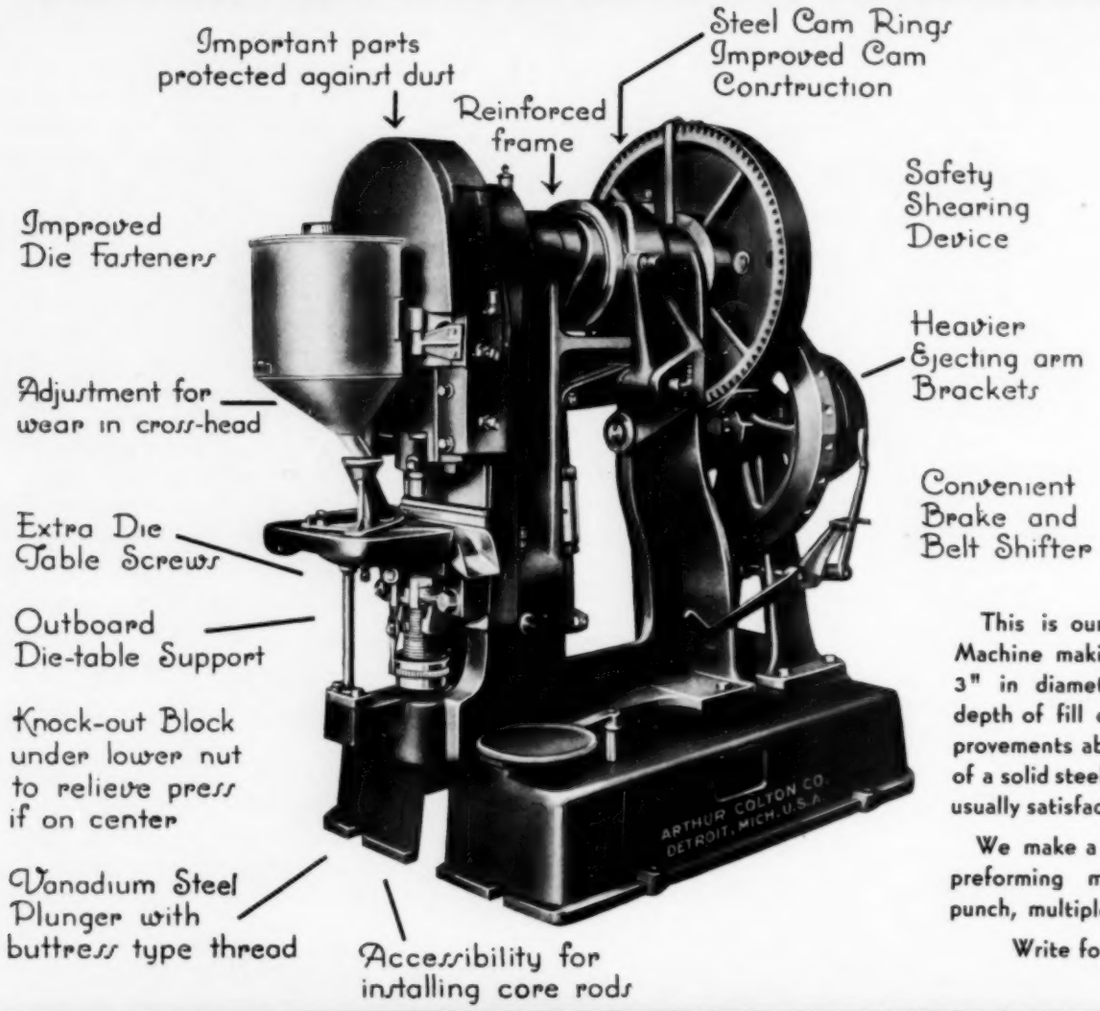
MEMBERS

J. B. Neal, Norton Laboratories, Inc.; G. C. Wilson, Norton Laboratories, Inc.; W. A. Freyer, Auburn Button Works, Inc.; G. K. Scribner, Boonton Molding Company; R. A. Austin, Reynolds Spring Company; W. S. Grove, American Insulator Corporation; G. V. Sammet, Northern Industrial Chemical Co.; F. H. Shaw, Shaw Insulator Company; C. A. Kurz, Kurz-Kasch Company; D. S. Kendall, Mack Molding Company; R. W. Post, Boonton Rubber Manufacturing Co.; H. D .Randall, General Electric Company; T. E. Giblin, General Electric Company; E. F. Bachner, Chicago Molded Products Corp.; R. A. Allen, American Record Corporation; Floyd Dunn, Diemolding Corporation.

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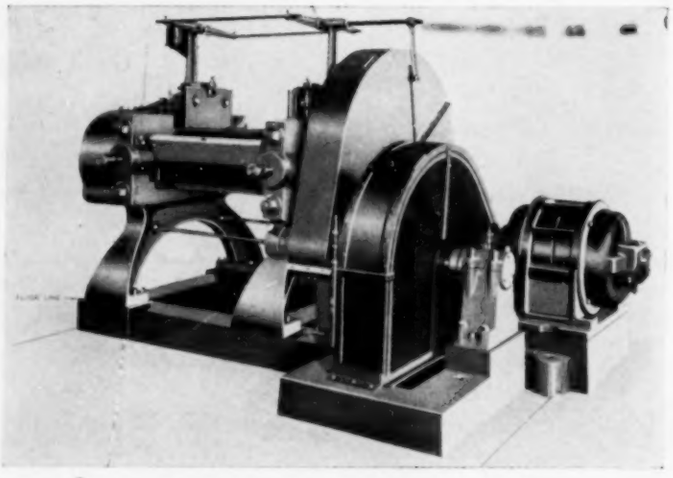
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Cellulose Acetate Technology

(*Continued from page 144*)

Chlorosulfonic acid		
U. S. P.	1,445,382	86
U. S. P.	1,708,787	125
Sulfuryl chloride		
U. S. P.	1,600,159	121
U. S. P.	1,708,787	125
B. P.	294,415	149
F. P.	663,268	168
Swiss P.	87,761	174
Phosphoric acid		
U. S. P.	1,445,382	86
B. P.	306,531	157
Phosphoric acid + sulfuric acid		
U. S. P.	1,690,632	94
Phosphorus pentoxide		
Swiss P.	90,874	175
Phosphorus pentoxide + chlorine		
U. S. P.	1,591,590	90
U. S. P.	1,668,959	34
Phosphorus chlorides		
B. P.	311,790	111
Phosphorus pentachloride and zinc chloride		
Swiss P.	87,767	174
Phosphorus oxychloride		
U. S. P.	1,600,159	121
Hydrochloric acid		
B. P.	287,540	68
B. P.	305,096	155
Hydrochloric acid (gaseous)		
B. P.	200,160	140
Hydrofluoric acid		
B. P.	303,136	107
B. P.	305,096	155
Chromic acid		
B. P.	305,096	155
Chromic + sulfuric acid		
B. P.	282,793	101
Manganic + sulfuric acids		
B. P.	282,793	101
Permanganic + sulfuric acids		
B. P.	282,793	101
Sulfur dioxide		
B. P.	200,160	140
Thionyl chloride		
B. P.	305,674	156
Monopersulfuric + sulfuric acid		
B. P.	282,793	101
Bromine		
B. P.	305,096	155
Bromine + sulfuric acid		
B. P.	303,135	152

Metal Salts

		Serial No.
Antimony chloride		
B. P.	377,790	111
Arsenic chloride		
B. P.	311,790	111
Bisulfate + sulfuric acid		
Swiss P.	94,022	119
Chromium salts		
U. S. P.	1,652,024	92
U. S. P.	1,655,870	93
Iron bromide		
B. P.	312,095	74
Iron chloride		
B. P.	312,096	159
Iron chloride and hydrochloric acid		
B. P.	309,201	109
Cobalt salts		
U. S. P.	1,655,870	93
Cobalt chloride		
U. S. P.	1,701,229	95
B. P.	312,096	159
Cobalt chloride + hydrochloric acid		
B. P.	309,201	109
Copper chloride		
B. P.	312,096	159
Copper chloride + hydrochloric acid		
B. P.	309,201	109
Manganese acetate + sulfuric acid		
B. P.	282,793	101
Manganese chloride		
B. P.	372,096	159
Manganese chloride and hydrochloric acid		
B. P.	309,201	109
Manganese sulfate and sulfuric acid		
B. P.	282,793	101
Nickel salts		
U. S. P.	1,655,870	93
Nickel chloride		
B. P.	372,096	159
Nickel chloride and hydrochloric acid		
B. P.	309,201	109
Perchlorates		
U. S. P.	1,645,915	91
Vanadium salts		
U. S. P.	1,655,870	93
Zinc acetate		
B. P.	301,036	151
Zinc chloride		
U. S. P.	1,478,137	31
U. S. P.	1,668,959	34
U. S. P.	1,701,229	95
U. S. P.	1,711,314	96
B. P.	333,432	153
B. P.	305,674	156
B. P.	306,537	157
Swiss P.	90,874	175
Zinc chloride and formaldehyde		
B. P.	312,280	112
Zinc chloride and phosphorus pentachloride		
Swiss P.	87,761	174
Zinc chloride and hydrochloric acid		
B. P.	293,724	105
B. P.	301,755	106
B. P.	338,323	108
Zinc chloride and sulfuric acid		
B. P.	301,755	106
Tin chloride		
B. P.	312,096	159

Organic Substances

Dimethyl sulfate		
B. P.	306,531	157
Formaldehyde and zinc chloride		
B. P.	312,280	112
Isopropylnaphthalenesulfonic acid		
B. P.	309,203	158
Peracetic + sulfuric acid		
B. P.	282,793	101

Editor's Note: This series will continue in the April issue.

Metduro Situation

STARTED about a couple of years ago under exceptionally good conditions, with a powerful board, the goodwill of the trade, and what was thought to be strong financial backing, the Metduro Company has since led a very checkered career. Unsuccessful trading, combined with changes of directors, managers and chairmen, have all told their tale until now there is an application in the Courts to wind the company up.

Owing to the refusal of a large number of Preference shareholders to pay calls due on their shares, the board has presented a petition for the winding-up of the company, which will be heard in a few day's time. It appears that the directors have been negotiating with certain shareholders in the hope that the amounts due should be paid and the company put in funds to pay its creditors in full and continue the business. These negotiations, however, have failed, and a writ has been issued on behalf of ninety-two shareholders repudiating their allotments.

The object of the company was to exploit a new plastic product, out of which a variety

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of articles, from ashtrays to household furniture could, it was claimed, be made. Technical difficulties which arose, however, were never successfully overcome. The Metropole Gramophone Co., a phonograph record manufacturing company associated with Metduro, will continue in business.

Mitchella Joins Adamson Machine

THE Directors of The Adamson Machine Company announced today that Mr. Clyde B. Mitchella has been appointed General Manager of this Akron concern.

Mr. Mitchella is coming to The Adamson Machine Company from The Republic Rubber Company of Youngstown, Ohio, where he has been Chief Engineer during the past five years.

He is well known in Akron, as he was educated in the Akron Public Schools; and prior to his Youngstown position, was in the Engineering Department of The B. F. Goodrich Company. He received his technical education at The Case School of Applied Science.

All-Vue Hand Mirrors

A display of the New All-Vue hand mirror is now a feature of the Du Pont Exhibit on the Boardwalk at Atlantic City. These mirrors are arranged to afford a view from every direction—front, side and back, and are suitable for use in beauty, millinery, dental, theatrical and other professions, as well as in the home. They are made of Pyralin in a number of pearl color effects to harmonize with the general color scheme or to fit in with some particular boudoir set. They are constructed with two facing mirrors, joined together with a hinge on a handle that is conveniently grasped. When manipulated by another person from behind, full reflections from all angles are visible. When closed, the mirror forms an attractive dressing table article, protected from dust, scratches and breakage.

TECHNICAL ABSTRACT SECTION

A Review of Literature and Patents

Porous Material. Harold W. Greider, assignor to the Philip Carey Mfg. Co. U. S. P. 1,782,384; Nov. 18, 1930.

The process of making molded heat insulation material of high microporosity comprising mixing light finely-divided and/or fibrous inorganic materials with water to form a semi-fluid or plastic mix dissolving alkali in the water of the mix, generating gas therein by incorporating a finely-divided substance which generates gas by reaction with the water of the mix and which is coated with an oily, resinous, waxy, or organic fatty acid substance, forming a relatively stable foam of minute bubbles containing said gas stabilized by the bubble forming and stabilizing agent formed by the reaction of the oily, resinous, waxy, or organic fatty acid substance with the alkali of the mix, and molding the mass under pressure with expulsion of water from the mold.

Shellac Composition. Richard E. Sumner, assignor to the Calco Chemical Co., Inc, U. S. P. 1,781,711; Nov. 18, 1930.

A specific example of a composition embodying the invention and adapted to produce a black record consists of the following ingredients in the proportions specified:

	Parts
Shellac	23.75
Nigrosine base	2.00
Cotton flock	4.00
Mineral filler	70.25

This composition produces a record superior in strength, in durability and in color to one produced from a similar composition having carbon black as the coloring medium and containing 5% more shellac than my composition.

Rubber Derivative and Method of Making Same. Harry L. Fisher and Herbert A. Winkelmann, assignors to the B. F. Goodrich Co., of New York, N. Y. U. S. P. 1,782,140; Nov. 18, 1930.

Example 1.—A rubber cement consisting of 7.3 parts by weight of rubber and 92.7 parts of benzene is placed in a suitable receptacle on a steam bath and 7.3 parts of dimethyl sulfate added thereto with stirring. The admixture is heated for several hours, the resulting product being a dark colored limpid liquid. The solvent is driven off from the liquid reaction mixture, as by distillation, leaving a mass of rubber through which the dimethyl sulfate is dispersed, and this solid residue is placed in an oven and heated for 21 hours at 125° C. The reaction product is a dark, almost black, hard, tough product.

Example 2.—As an example of the preparation of a heat-plastic product by the use of a dialkyl sulfate, take 10 parts by weight of diethyl sulfate and intimately disperse it through 100 parts by weight of crude rubber, preferably by milling the reagents into the rubber, as on a rubber mill, and subject the mass to heat at 140° C. for 8 hours. A strong exothermal reaction takes place in from one to two hours, gases being given off. The resulting product is a tough, heat-plastic material having a relatively low softening temperature. It is dark in color and is readily remoldable into any desired shape when heated. It dissolves in the well-known rubber solvents, such as benzene, gasoline, carbon tetrachloride, carbon disulfide, etc., but is practically insoluble in alcohol, ether, water, dilute acids and alkalies. It is relatively stable under atmospheric conditions.

Preparation of Rubberlike Masses. Herman Alexander Bruson, assignor to the Resinous Products & Chemical Co. U. S. P. 1,783,167; Nov. 25, 1930.

64.4 parts of glycerol, 212 parts of sebacic acid, 166 parts of raw castor oil were heated in an open vessel fitted with a stirrer, to a temperature of 170-175° C. After about ten hours heating, a very tough, rubbery mass is formed which is fluid while hot. Upon cooling however, it forms a stiff jelly which is soluble in butyl acetate, acetone, ethyl acetate, glycol ethers, but is insoluble in ethyl alcohol, butanol or toluol.

By heating the mixture for about 16 hours the jelly becomes insoluble in all organic solvents. 100 parts of this insoluble material which forms a tough, rubbery mass when cold is ground in a paint grinder with 200 parts of butyl acetate. It forms a homogeneous solution, which upon evaporation deposits a tough, adherent rubbery film which is resilient and adherent.

Eight other examples are given.

Insulating Varnishes and Synthetic Resins. J. T. Mon. Peinture18, 212-3 (1930. Am. Paint & Varnish Manufrs.' Assocn. Abstract Rev. 189 (1930).

A brief but comprehensive review of synthetic resins of various types including Bakelite, ester gums, glyptals, albertols, amberols, etc. Their use in insulating varnishes is indicated with recommendations of best solvents.

Physical Properties of Synthetic Resins in Lacquers. A. W. Van Heuckeroth. Am. Paint & Varnish Manufrs.' Assocn. Circ. 369, 354,417 (1930).

All resins available on the American market were examined for acid value, softening point, color, soly. and miscibility with nitro-cellulose and cellulose acetate and lacquers contg. them were examd. for resistance to abrasion, adherence, tensile strength and elongation, yellowing, permeability to water and behavior on exposure outdoors. The following are the types of resin and no. of resins of each type examd.: glyptal 12, ester gum 9, polymerized vinyl compds. 7, unknown 6, cyclo-hexanonevinyl 3, ester gum-chlorinated diphenyl 3, amberol 2, amide-HCHO 2, bakelite 2, cummar 2, chlorinated diphenyl 2, phthalic anhydride-PhOH 1, ester gum-phthalic anhydride-phenol 1, ester gum-phthalic anhydride 1 and shellac 1.

Resin-Coated Pulpboard. H. C. Harvey and H. L. Becher, assignors to: Agasote Millboard Company. U. S P. 1,776,790.

An artificial board is made by backing ordinary pulp board, contg. a non-fluxing binder, with sheets of paper which have been impregnated with synthetic resin, e. g., of the phenolic type. For example, 1000 lbs. of waste paper are beaten with 110-130 lbs. of linseed or chinawood oil or rosin soap to which has been added 10-20% of tannic acid. The soap is then precipitated with 45-55 lbs of alum. The mixt. is molded, pressed, dried and the impregnated paper pressed on at a high temperature.

Synthetic Resins. Bakelite Gesselschaft m.b.H. Brit. P. 333,296. Addn. to 318,883.

In the production of shaped articles from urea-formaldehyde resins, catalysts are used to accelerate or retard the reaction. To retard the reaction, i.e., to keep the mass in fluid condition longer, basic catalysts are used, such as ammonia, lime, hexamethylenetetramine, sodium carbonate, etc.; and to accelerate the reaction, acids or acid salts are used, such as hydrochloric acetic. citric acid or urea nitrate. Neutral catalysts usually accelerate the reaction.

Abrasive Articles. Carborundum Co., Ltd. (N. P. Robie) Brit. P. 333,409.

Abrasive materials such as alumina, emery corundum, etc., are bonded together with synthetic resins such, phenol-aldehyde or acid-glycerol resins, to which fillers may be added.

Porous Organic Material. E. C. Bayer. U. S. P. 1,777,247; Sept. 30, 1930.

An insulating material is made by incorporating a previously produced foam with a mixture of organic substances which will harden when the solvent is removed or when treated chemically. For example, 550 cc. of a 35% soln, of gelatin and 150 cc.

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of a 5% soln. of formaldehyde are made to foam and fill 25 liters, a foam stabilizer being added which consists of resin soap 1.25%, glue 0.5% and water 98.7%. Upon removal of water by drying, the mass hardens to a porous material.

Electrical Insulating Material. Telefunken Ges: für drahtlose Telegraphic m.b.H. Fr. P. 683,541. Filed 10-19-29. Issued 6-13-30.

Materials to be used in electrical insulation are given piezoelectric properties by allowing them to congeal from a molten condition in a strong electrical field. Examples are given of mixtures of quartz with paraffin, inert materials with natural or artificial resins and asphalt with oils or waxes.

Synthetic Resins. I. G. Farbenindustrie Akt.-Ges. Assignee of: Otto Schmidt and Karl Seydel. Ger. P. 500,504. Filed 7-11-25. Issued 7-4-30.

Resin acids, or organic acids of greater basicity, or their anhydrides, are condensed with sorbite, either alone or with other alcohols, if necessary in the presence of a catalyst, e. g., boric acid. For example:—150 parts of rosin are heated during stirring with 18 parts of sorbite at 250° until no more water is evolved. The product is insoluble in alcohol, but soluble in fatty oils. The condensation may be carried out under pressure or in a vacuum.

Synthetic Resins. Hans Wolff and Heinrich Zellner. Ger. P. 502,263. Filed June 10, 1926. Issued July 21, 1930.

Resins made by esterifying rosin with glycerol, glycols, phenols, etc. are improved if at least one hydroxyl group of the alcohol, mol. is allowed to remain free. Such resins impart to nitrocellulose films a hardness and toughness not given by completely esterified compounds, and they thus make possible the use of smaller amounts of plasticizer. The partly esterified glycerol ester may be made by condensing 1 mol. of lead abietate with 1 mol. of dichlorohydrin:

$$PbA_2 + CH_2Cl.\ CHCl.\ CH_2OH = PbCl_2 + CH_2A.\ CHA.\ CH_2OH,$$

the A representing the abietic acid mol. minus the acid H. The free acid ordinarily present in lead abietate will be present as an impurity in the product and can be removed by washing with alkali.

Similarly, lead abietate may be allowed to react with the cresol derivative $C_6H_4OH.\ CH_2Cl$. The product of this reaction will contain a free OH group in the C_6H_4 nucleus. Or both OH groups of $C_6H_4OH.\ CH_2OH$ may be esterified and on saponification only the ester group in the side chain is affected, resulting in a product contg. free OH in the side chain. Similar products, but of a less definite structure, are obtained when polyhydric alcohol are esterified with insufficient acid to react with ail OH groups present, e. g., 1 or 2 mols. of abietic acid with 1 mol, of glycerol.

Phenol Resinoids in Oil Varnishes. V H. Turkington, R. C. Shuey and W. H. Butler. Ind. Eng. Chem. 22, 1177-80 (1930).

Phenol resinoids have recently been developed which are soluble in drying oils. One of them, Bakelite XR-254. (I), has been thoroughly investigated as a varnish ingredient and compared with ester gum (II) with regard to a number of properties of the varnishes prepared with them and with mixtures of them. Two cooks were prepared, one containing I and the other II to the extent of 100 lbs. of resin to 200 lbs. of chinawood oil. Lead and manganese driers were present in equal amounts in both varnishes. These varnishes, containing the single resins, were tested along with blends of the 2 containing from 2 to 75% of (I). All varnishes were thinned with mineral spirits and turpentine (9:1). The results of tests show that the I varnish dries much faster, is harder, more elastic, more durable (to weather conditions) and more resistant to boiling water and soap solution than the II varnish. Even the presence of only 2% of I markedly decreased the drying time (7.5 to 6.75 hrs.), increased the hardness and increased slightly the resistance to boiling 5% soap solution.

Artificial Resins in the Varnish Industry. Anonymous. Seifensieder-Ztg. 57, 765 (1930).

The qualities of the Albertol resins, which give them special value in varnishes, are briefly discussed.

Synthetic Resins. H. Honel. Brit. P. 334,572. Filed May 8, 1929.

Substituted phenol-aldehyde resins are condensed in the presence of an alkaline agent, and with the evolution of water with esters to form substances of an oily to a rubber-like consistency. The substituted phenol must have not more than 2 of the two o- and one p- positions to the OH unsubstituted, and preferably should have 2 such positions unoccupied. The substituents may be alkyl, or aryl, aralkyl, hydroaromatic or oxyalkyl in nature or it may be chlorine. One or both m- positions may also be occupied. The esters may be of various kinds, namely low mol. wt., such as glycerol esters of acids of high moleculars weight. Many examples are given, including the following:— (1) guaiacol formaldehyde resin and the glycerol ester of mixed abietic and sebacic acids, (2) o-cresol-methyl cyclohexanone formaldehyde resin and the glycerol ester of mixed abietic and camphoric acids, (compatible, with nitrocellulose), etc.

Shellac Substitute. Walter Dux. Ger. P. 504,828. Filed Nov. 22, 1927. Issued Aug. 14, 1930.

Chlorinated unsaturated aliphatic or hydroaromatic acids, e. g. abietic or linseed oil acid, are condensed with a similar halogenated compounds or with a hydroxy acid, such as trioxystearic acid.

Synthetic Resins. I. G. Farbenindustrie Akt. Ges. Assignee of: Arthur Voss. Ger. P. 506,148. Filed Jan. 18, 1927. Issued Aug. 29, 1930.

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Hydraulic Operating Valves



Fig. 1

Fig. 1 represents a valve for operating Semi-Automatic Presses for Hot or Cold Molding, using high and low water pressures and Relief, either with or without single or double "Pull-Back" cylinders. The operating lever can be placed in any position shown in Fig. 2.

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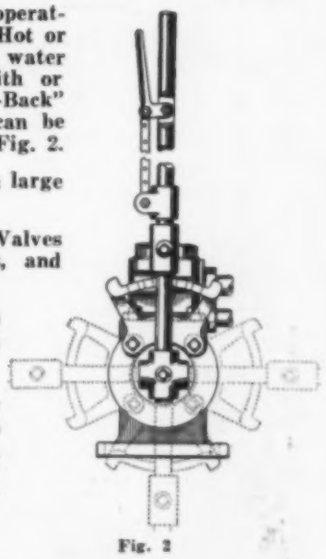
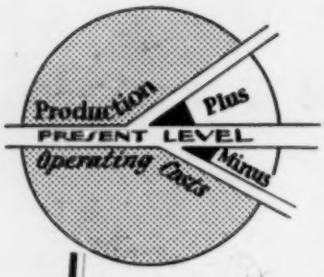


Fig. 2

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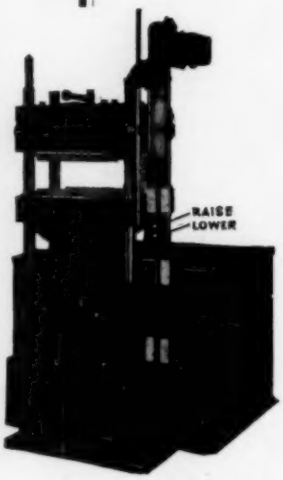
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Write for Bulletin

Polyvinyl esters of low molecular weight aliphatic acids are condensed with high molecular weight acids or their esters. Example:—75 parts of rosin are heated in vacuo for a long time with 18 parts of polyvinyl acetate. A clear liquid distills over at about 200°. At 250° the reaction is complete. A clear resin remains which is soluble in benzene and linseed oil but insoluble in acids and alkalis. It is useful in preparing oil varnishes. Other examples include the reaction between (1) equal parts of linseed oil, rosin and polyvinyl acetate, (2) abietic acid and polyvinyl propionate, (3) manila copal and polyvinyl n-butyrate, (4) ricinoleic acid and polyvinyl acetate, (5) naphthenic acids, polyvinyl acetate and tetralin.

Synthetic Resins. Compagnie Francaise pour l'Exploitation des Procédés Thomson-Houston. Fr. P. 683,772. Filed Oct. 23, 1929. Issued June 17, 1930.

Artificial resins of a glyptal base are prepared, having additions of terpene compounds, such as borneol, camphoric acid, pinene, isoprene, dipentene, cedarwood oil, citronella oil, diterpenes, etc. For example: — Phthalic anhydride 24.3, borneol 10 and glycerol 5 parts are heated together at 150°.

Process of Esterifying Cellulose. Franz Becker, Heinrich Heimann, and Alfons Bayerl, assignors to I. G. Farbenindustrie Aktiengesellschaft U. S. P. 1,780,151; Nov. 4, 1930.

Example 1.—Air-dry cotton is treated for 1 hour at 50° C. with air which has been saturated with nitric acid vapor by passage at 25° C. through nitric acid of a high percentage strength) 96-100 per cent.). The excess of nitric acid is expelled and recovered from the fibrous mass by means of fresh air. The mass which is nearly free from acid is washed with water and dried. Its content of nitrogen amounts to 2-3 per cent.

100 parts by weight of the cotton which has thus been treated and contains 2.7 per cent of nitrogen are introduced at 10° C. into a mixture of 400 parts of glacial acetic acid, 300 parts of acetic anhydride and 2.5 parts of sulfuric acid of 95 per cent. strength. The temperature rises to about 30° C. within 20 minutes. At 30° C. the mass is dissolved completely after 2 hours. After addition of dilute aqueous sulfuric acid the ester which has formed is hydrolyzed in known manner until the desired solubility in acetone or the like is attained. The solution of the nitro-acetyl cellulose thus obtained is clear and easily flowing and gives excellent water-proof films and lacquers. There are two more examples.

Production of Partially-Hydrolyzed Cellulose Acetates. Samuel Isidoor Vles, of Arnhem, Netherlands. U. S. U. 1,782,796; Nov. 25, 1930.

A mixture of 5 c. c. H_2SO_4 specific gravity 1.84), 46 c. c. of water and 55 c. c. glacial acetic acid is added to a

litre of a solution of cellulose-tri-acetate in glacial acetic acid containing 160 gr. of acetate.

The hydrolysis is carried out at 20° C. until the desired acetyl number is obtained and the solution in acetone of the acetate separated out has reached the aforementioned viscosity.

Method and Apparatus for Feeding Disks to a Closing Mold. Louis T. Frederick, of Valparaiso, Indiana, assignor, to Continental Diamond Fibre Company, of Newark, Delaware. U. S. P. 1,782,989; Nov. 25, 1930.

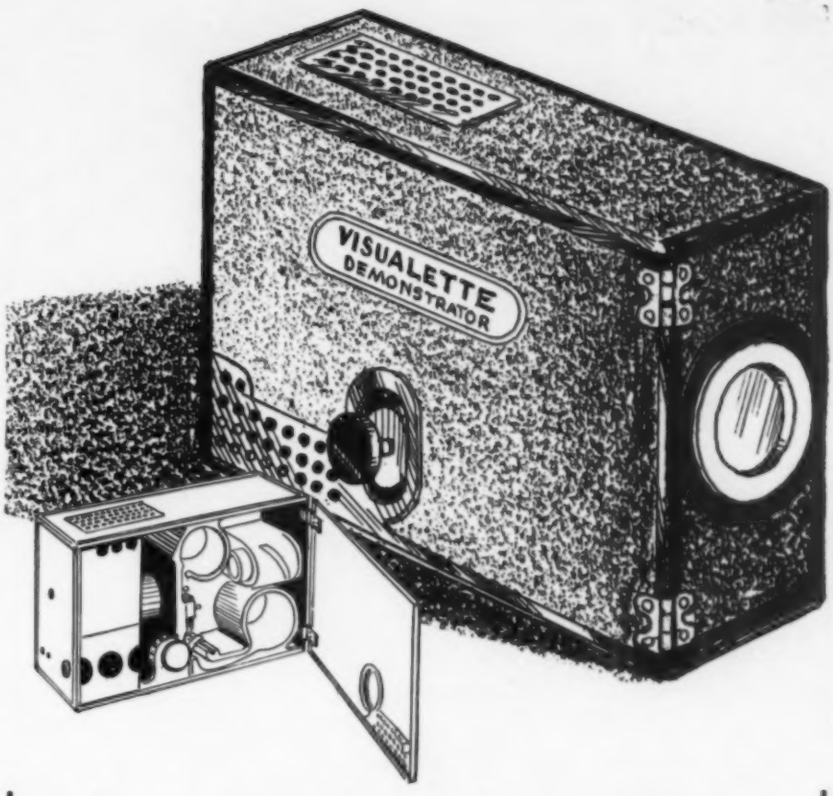
1. In a device of the class described, a pair of forming dies, a conveyor adapted to receive material, means for moving said conveyor between the dies, means interrupting said movement whereby the material carried by the conveyor may be held stationary between said dies, and means for closing the dies while the material is so positioned whereby to configurate the material directly between the dies.

Cellulose Esters of Both Nitric Acid and an Organic Acid. Franz Becker, assignor to I. G. Farbenindustrie Aktiengesellschaft. U. S. P. 1,783,771; Dec. 2, 1930.

Example 1.—100 parts of bleached short fibrous cotton, 500 parts of acetic acid of 99% strength and 1 part of sulfuric acid of 95% strength are shaken together in a flask for 6 hours at 20° C. Then the mass is introduced into a kneading apparatus and 350 parts of acetic anhydride are added. When, after about 3-5 hours, an homogeneous fibrous magma is formed, 4.2 parts of concentrated sulfuric acid, dissolved in 23 parts of glacial acetic acid and then after about 5 minutes 12.5 parts of nitric acid of 98-100% strength, also dissolved in glacial acetic acid, are added. At the temperature of 30-40° C. the solution becomes free from fibre in the course of 1 hour. The conversion into a product soluble in acetone follows for instance the procedure described in German specification No. 252,706. The finished nitro-acetyl-cellulose contains about 1.5% of nitrogen. Films obtained from it are of good strength and their lengthening in water amounts to only 30-40% of that of pure acetyl-cellulose.

Pliable Masses from Cellulose Esters. Oskar Loehr, assignor to I. G. Farbenindustrie Aktiengesellschaft. U. S. P. 1,783,176; Dec. 2, 1930.

In the application of the invention dissolve for example 16 parts by weight of acetyl cellulose together with 8 parts by weight of a mixture of the benzoic acid esters of a mixture of polyethylene glycols consisting essentially of diethylene glycol boiling under 15 mm. pressure from 230 to 260° and containing no free hydroxyl groups in 50 parts by weight of acetone and 20 parts by weight of cyclohexanone. The solution on pouring and evaporating the solvent yields a film of excellent properties.



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FINANCIAL NOTES

Du Pont Report

E. I. Du Pont de Nemours & Co., in its annual report for 1930, shows earnings applicable to common stock were $49,990,-029 or $4.64 a share earned on the average number of 10,783,-555 shares outstanding, which compares with $72,300,627, or $7.09 a share earned on the average number of 10,196,777 shares outstanding for 1929.

The acquisition of Roessler & Hasslacher in May added a large number of chemical specialties to the company's list of products. Approximately $28,000,-000 were expended in the provision of extensions of manufacturing facilities for several of the newer industries, in the modernization of older plants, and the addition of a new section to the home office building in Wilmington.

Celluloid Corporation

DIRECTORS of the Celluloid Corporation have omitted quarterly dividends of $1.75 a share on the preferred stock.

United States Industrial Alcohol

REPORT of the United States States Industrial Alcohol Company for the last half of 1930 showed net income of $540,018, bringing total net income for the year to $1,160,788, equal to $3.10 a share on 373,-846 shares of common stock outstanding. In the last half of 1929 the company showed earnings of $3,024,806, and for the full year $4,721,000, or $12.63 a share on the common.

Pyrometer Representatives

ILLINOIS Testing Laboratories, Inc., 141 W. Austin Avenue, Chicago, Illinois has appointed Porter Hurd, 516 Packard Building, Philadelphia, Pennsylvania, as its representative in Eastern Pennsylvania, Southern New Jersey, Delaware and Maryland for its line of portable and stationary Indicating Pyrometers, Resistance Thermometers and other measuring instruments for industrial purposes.

BUYERS' GUIDE

ACCUMULATORS
The Burroughs Co.
John J. Cavagnaro, Harrison, N. J.
The Dunning & Boschert Press Co., Inc.
Chas. F. Elmes Engineering Works
R. D. Wood

ALDUR
Aldur Corporation

AMMONIA
Barrett Co.

BEETLE
Synthetic Plastics Co.

BAKELITE
Bakelite Corporation

BENZOL
Barrett Co.

CASEIN
American-British Chemical Supplies, Inc.

CASEIN PLASTICS
Aladdinite Co.
Erinoid Co. of America
Karolith Corp.

CATALIN
Amer. Catalin Corp.

CELLULOSE ACETATE
American-British Chemical Supplies, Inc.
Celluloid Corporation
Eastman Kodak Co.
U. S. Industrial Alcohol Co.

CONTAINERS
Carpenter Container Corp.

COTTON FLOCK
Claremont Waste Mfg. Co.
Peckham Mfg. Co.

CRESOL
Barrett Co.

CRESYLIC ACID
American-British Chemical Supplies, Inc.
Barrett Co.

CUSTOM MOLDERS
American Insulator Corp.
American Record Corp.
Auburn Button Co.
Boonton Moulding Co.
Boonton Rubber Mfg. Co.
Colt's Patent Fire Arms Mfg. Co.
Diemolding Corp.
Garfield Mfg. Co.
General Elec. Co.
Harry W. Hahn Mfg. Co.
Insulation Mfg. Co.
Kuhn & Jacob, Trenton, N. J.
Kurz-Kasch Co., Dayton, Ohio
Mack Molding Co.
Monowatt Electric Corp.
Northern Indus. Chem. Co., Boston, Mass.
Norton Laboratories, Lockport, N. Y.
Recto Mfg. Co., Cincinnati, Ohio
Reynolds Spring Company
Shaw Insulator Co.

DUREZ
General Plastics Inc.

DYESTUFFS
Calco Chemical Co.
General Dyestuff Corp.

ERINOID
Erinold Co. of America

FIBERLOID
Fiberloid Corp.

FORMALDEHYDE
Heyden Chemical Corp.
Roessler & Hasslacher Chemical Co.

GLASS, SILVERED
Standard Mirror Co.

HEAT REGISTERING INSTRUMENTS
Cambridge Instrument Co.

LABELS
Economy Ticket & Label Co.

LUMARITH
Celluloid Corporation

MALEIC ACID
Monsanto Chemical Works

MANICURE ARTICLES
C. J. Bates & Sons, Chester, Conn.

MEASURING MACHINES
F. J. Stokes Mach. Co.

MIRRORS
Standard Mirror Co.

MIXERS
Baker Perkins Co.
E. G. Loomis Co.

MOLDING EQUIPMENT
Burroughs Co., The
Fred S. Carver, N. Y.
John J. Cavagnaro
Evarts G. Loomis Co.
Chas. F. Elmes Engineering Works
Southwark Foundry & Mach. Co.
Standard Machinery Co.
Terkelsen Machine Co.
Thropp, Wm. R. & Sons, Co.
Dunning & Boschert Press Co.
French Oil Mill Machinery Co.
Index Machinery Corp.
R. D. Wood Corp.

MOLDING POWDERS
Aldur Corp.
Bakelite Corp.
Celluloid Corp.
General Plastics, Inc.
Synthetic Plastics Co., Inc.

PEARL COATING
Celluloid Corporation

PHENOL
Barrett Co.
Dow Chemical Co.
Monsanto Chemical Works

PHENOL RESINOIDS
Bakelite Corporation
General Plastics Inc.
Resinox Corp.

PHTHALIC ANHYDRIDE
Monsanto Chemical Works

PLASTICIZERS
American-British Chemical Supplies, Inc.
Monsanto Chemical Works

PREFORMING PRESSES
Arthur Colton Co.
Standard Machinery Co.
F. J. Stokes Mach. Co.

PYROXYLIN PLASTICS
Celluloid Corporation
Du Pont Viscoloid Co.
Nixon Nitration Works
Wiggins & Co., Inc., E. W.

STEEL, TOOL
Wm. Jessop & Sons, Inc.

SWING JOINTS
Burroughs Co., The
Evarts G. Loomis Co.
French Oil Machinery Co.

TOLUOL
Barrett Co.

UREA-FORMALDEHYDE RESINS
Aldur Corporation
Synthetic Plastics Co., Inc.

VARNISHES, SYNTHETIC RESIN
Bakelite Corp.
General Plastics, Inc.

WOOD FLOUR
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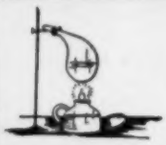
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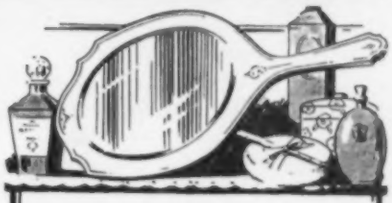
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Book Department, Plastics --- 114 E. 32nd St., New York

And Now, In Closing:

RUMORS since the first of the year regarding casein plastics have finally crystallized . . . . the consolidation of three companies is reported in this issue . . . . certainly a stabilizing influence . . . . Among those who took brief vacations during early February was Chris Kurz . . . . He drove from Dayton to Miami and spent ten days . . . . the Universal Molding Company in San Francisco is a new one . . . . We're hunting now for the Differential . . . . Here in the East things are hubbubing around the Bank of the United States . . . . Some people in the plastic game took the rap on it . . . . The name "Luck O' London" that appears in Monsanto Current Events also shows up across the water . . . . which reminds us that awhile ago we were talking about the revival of indoor games . . . . this one looks like cribbage . . . . British Plasticians (those of the Great Empire, addresses unknown) can now finish each day with "Dear Diary" . . . . Production, in all branches, has been slow this past month . . . . and unemployment is still acute . . . . which leads us on . . . .

THOSE self-appointed "Voices of Industry" that continually crop up usually issue from buffoons, the oldest form of musical entertainment. They recently predicted a sudden and complete change for the better in business, and as an index of how wrong they were we might point out that there were two failures within twenty days,—one powder and one machinery. The sooner our official and unofficial spokesmen realize that the revival is to be slow in coming, that it will be the result, and the combination, of work and headaches, the sooner we will be purged of a lot of unfertile soil. With wild chariot-drivers holding the reins (and the purse strings), the spectator has to watch much more than the race. Business is better for the simple reason that it couldn't have been much worse, but you cannot expect it to pay an annual dividend after sixty days' work. The man who is doing something startling is the one who can accommodate his own efforts. It is wise to bear in mind that the dictionary definition of prosperity is "successful progress in one's enterprises".

A MRS. Z, of Brownell, Kansas, accelerates our reflexes this month by writing that our publication "was received to-day, and it is all Latin to me". Quite right, since you are interested in plaster of paris, Mrs. Z. The manufacturer of lollipops won't make a better product by subscribing to the "Wall Street Journal".

WE are rather late in commenting on the article, "Aladdins of the Test Tubes", that appeared in Collier's early in October. We waited to see other comments first, and we were gratified to note that the author, William Pickett Helm, was roundly taken to task by other publications. It is the despair of the modern chemist to learn that he ". . . is the Aladdin of industry. He mixes his potions and philters, rubs his hands on a towel, and from his vials float up modern genii to slave for business", and that, with cottonseed hulls "he did his stuff and rubbed his hands. Presto! Floated up a rare and wonderful sugar . . . xylose". Such an aura of magic is unfair to the hard and tireless worker of the laboratory. Incessant poring over patents, chemicals and machinery; months and even years of night and day labor; dins of industrial sweatshops, duns of creditors, roars of production managers; all these Mr. Helm classifies as "hand-rubbing". Yet we cannot change the more popular fancies, and if the public believes that "waste may be turned into gold" with a flip of the wrist, it is the joy of the chemist to take it and like it. Industrial magic may occur, but the patent offices would look on it as sleight-of-hand.

From the A. P. & P. A. Weekly

"Our present industrial state finds us suffering from the consequences of hand-to-mouth business. The idea spread to purchasing, marketing, finance, banking and tended toward hand-to-mouth thinking along many lines. The problem to be solved was always that of the immediate future and the outlook never seriously considered the possibilities of the more distant future. The truth of this statement will be realized when it is considered how surprised we are to find that the year of our greatest industrial activity was followed by intense depression.

No plans had been made which took into consideration the possibility of such a change in conditions. To avoid a recurrence of this situation, industry will have to establish operations on a more sound basis and take a longer view ahead. Business cycles have not been eliminated. Plans must be made for the next period of business expansion and these plans must be adhered to. In any forward planning, the trade association can play an active part.

Overheard in the pressroom. "Say, Bill, we need some more of this oxybenzylomethylenglycolanhydride!"